

March 22, 1950

A McGraw-Hill Publication

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AVIATION

The Oldest American Aeronautical Magazine

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STATISTICAL ISSUE

Production, Distribution, Operation

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R. BERRY FOWLER, Jr.
Associate Editor

LESLIE E. SPILLER
Features Editor

CHARLES H. GALT

DONALD J. LANE

CHARLES E. STEPHANIAN
Publicity Editor



The Oldest American Aeronautical Magazine

EDWARD F. STANLEY, Editor

LESLIE E. SPILLER, Jr., Publishing Director

HAROLD F. FISHER

WILLIAM D. SPENCER
Contributing Editor

CHARLES E. STONE

EDWARD G. FARRINGTON, Jr.

JOHN E. SPILLER
General Editor

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JOHN E. SPILLER, President

LESLIE E. SPILLER, Jr., Vice President

CHARLES H. GALT, Treasurer

WILLIAM D. SPENCER, Secretary

EDWARD G. FARRINGTON, Jr., Editor

JOHN E. SPILLER, Jr., Managing Editor

New York Office: 1221 Ave. at 36th St.

Chicago Office: 310 S. Michigan Ave.

San Francisco Office: 225 Bush St.

London Office: 122, Strand, W.C.2

Paris Office: 12, Rue de la Harpe, 75001

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High Speed	132 M. P. H.	Duration	4½ hours
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Landing	40 M. P. H.	Height (on wheels)	11 ft. 2 in.
Climb (at sea level)	300 ft. per min.	Span	42 ft. 2 in.
Service Ceiling	14,000 ft.	Wing Area	445 sq. ft.
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Specifications of the Kittyhawk Model B-4

Engine—Kinner E-5	102 H. P.	Weight empty	1107 lbs.
Approved Type Certificate No. 155		Useful load	728 lbs.
Length overall	29 ft. 11 in.	High speed	170 m. p. h.
Height overall	8 ft. 9 in.	Cruising speed	90 m. p. h.
Span (with wings)	35 ft.	Landing speed	38 m. p. h.
Chord both wings	4 ft. 0 in.	Climb	1200 ft. per min.
Wing area	233.4 sq. ft.		

also Approved Type Certificate as a seaplane

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 Fairchild Eng. Corp.
 Kaiser Aircraft & Motor Corp.
 Lombard Aircraft Co.
 (General) Volvo Motors Corp.
 Lubliner Aircraft Engine Co.
 Lycoming Engine
 MacCleskey Manufacturing Co.
 Mooney Motors, Inc.
 Moynihan Aero Engine Corp.
 Pratt Department
 Pratt & Whitney Aircraft
 Raytheon Aircraft Corp.
 Republic Aircraft Corp.
 Wright Aero Corp.

AUTOMOBILES
 Chrysler Corp.
 Continental Motors Corp.
 Dodge Ram Corp.
 Duesenberg Motor Co.
 (American) Ford Motor Company
 H. H. Franklin Mfg. Co.
 Jeep Motor Car Corp.
 Johnson Motors Car Co.
 Locomobile Co. of America, Inc.
 Marmon Motor Car Co.
 Packard Motor Car Co.
 Pontiac Motor Company
 The Studebaker Corp.
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Air-Crete Engine Corp.
Allison Engineering Co.
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Andrus Machine Co.
Caterpillar Engine Corp.
Cincinnati Machine Corp.
Curtis Aero & Motor Co.
Fairchild Eng. Corp.
Kaiser Aluminum & Mfg. Corp.
Lambert Aircraft Co.
General Valve Motor Corp.
Lafayette Aircraft Engine Co.
Lycoming Motor
MacClure Manufacturing Co.
Manitowoc Irons, Inc.
Mellor Aero Engine Corp.
New Brunswick
Pitt & Moore Aircraft
Pitt Shop, Inc. Corp.
Waco Aircraft Corp.
Wright Aero. Corp.

NETWORKING 101

Crysler Corp.
Continental Motors Corp.
Dodge Ram Corp.
Ducati Motor Co.
(Lamborghini) Ford Motor Company
H. H. Ford Inc. 50% Co.
Honda Motor Corp.
Infiniti Motor Co. Co.
Lexus Motor Co. of America, Inc.
Mazda Motor Corp.
Mercedes-Benz Motor Co.
Porsche Motor Co.
Porsche Leasing Company
The Shelbyville Corp.
Volvo Cars Corporation

SEALIST

Consolidated Ship Repair
Burlington Engine Co.

STROCKS, TRACTORS, ETC.

The Anderson Company
S. D. Baker Co.
Buckley Truck Co.
Buckle Co.
Buffalo Iron-Field Roller Co.
Cham Engineering Co.
The Ford Wheel & Tire Co.
Fitz-Rand Health Co.
Hawkins Motor Corp.
Hudson Truck Corp.
International Marine Co.
International Harvester Co.
Le-Bri Company
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Worcester Motor Co.

135 manufacturers use Stromberg carburetors as standard equipment. This impressive list, shown here, contains representative firms in every line of industry where motors are used.

These firms KNOW that Stromberg superior performance is the result of the highest type of carburetion engineering, the finest workmanship, the best materials procurable.

They recognize real merit and are willing to pay for it.

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"...It's Not-a KINNER MOTOR!"

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Genuine Kinner Parts, manufactured to Kinner standards for quality, precision and balance, can only be secured from him.

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A NEW PROBLEM faces the Aviation Industry. Expanding production programs demand a vast increase in welding operations. More welds must be completed—economically and with the same high quality and reliability.

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DO NOT blame the pilot if your ship comes galloping across the field like a small boy riding a stick . . . look to the landing gear.

Some planes jolt and joggle on the ground even though the field is not dangerously rough or rutty. But . . . any landing field, rough or smooth, is not a hazard to Gruss equipped ships.

The lightning like action of Gruss struts absorbs the effect of ruts and bumps instantly. A Gruss equipped plane will land and taxi smoothly . . . the wheels follow the broken contour of the ground; the fuselage maintains an even keel.

Gruss retards depreciation. Gruss, without rebound, counteracts landing vibration with its air and oil action. In addition, Gruss struts now come to you as complete units, streamlined in our factory and shipped to you, with fittings, ready to install in your plane. By comparison, Gruss struts are pounds lighter. The price will interest you.

To lessen sales resistance, to guarantee complete owner satisfaction, change to Gruss!

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PENNZOIL

"THE BEST MOTOR OIL IN THE WORLD"

It's significant that Pennzoil is the choice of America's good operators. Significant, too, that America's great passenger lines specify Pennzoil for every plane. If you have never used Pennzoil, you may wonder why. Here, then, are the facts:

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your motor will be at its best in every emergency.

The reasons for Pennzoil's superiority are obvious. It is made from 100% pure Pennsylvania crude—and nothing else. It is always uniform because it is refined only by the famous Pennzoil process in the refineries of the Pennzoil Company—largest organization in the world operating exclusively on Pennsylvania crude.

Make Pennzoil part of your standard equipment—it is the safest, most economical lubrication for any plane.

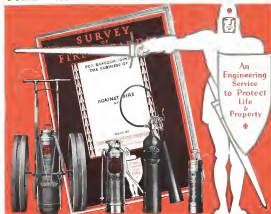
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LaFrance and Foamite—already protecting over 150 of the lead-

ing airports—offers a complete engineering service for safeguarding airports against fire. This service includes:

A complete study by fire protection engineers. The supplying of proper and adequate safeguards. Inspection of your employees on the proper use of the equipment. Inspection and maintenance service—if you like—by our engineers

to insure constant readiness of equipment for operation.

Whatever the condition at your airport, this service can protect it against fire. Write for one of our fire protection engineers to call or for a copy of "Summit Breasts", a booklet covering airport inside and out—method of fire protection. American-LaFrance and Foamite Corporation, Dept. T60, Elmsford, N.Y.

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KEYSTONE-LOENING AMPHIBIAN "AIR YACHT"



A PASSENGER A MINUTE

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The original schedule of fifteen-minute sailings—"most frequent air ferry schedule in the world"—was found far too infrequent to supply opening traffic demands. The schedule was halved to seven minutes, and a total of 1630 passengers were transported the first three days of operation. On the third day, 384 passengers were carried in 384 flying minutes—a passenger a minute!

Substantial business men sponsor and direct the activities of Air Ferries, Ltd. They chose Keystone-Loening Amphibians as representative of their own sound business policies—swift, comfortable service with profitably low operating and maintenance costs. Their success is as much a matter of course as that of many other lines using these famous planes. Throughout the western hemisphere, from Alaska to Cape Horn, these sturdy boats of the air are clocking their schedules, earning substantial dividends. They are built for business!

We will gladly demonstrate to interested transport executives the ready adaptability and fitness of the Air Yacht for their requirements. Write Dept. K-73.

6 in 8 passengers • 225 M. P. • 160 M. P. R. Cruising Speed

KEYSTONE AIRCRAFT CORPORATION

DESIGNED BY CURTISS-WRIGHT
SALES OFFICE 37 WEST 37th STREET NEW YORK



Joseph J. Flynn, Jr., President, Air Ferries, Ltd., and two other executives of the firm, standing next to one of the new Keystone-Loening Amphibian Air Yachts.



AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McCREY PUBLICATION .. . ESTABLISHED 1915

EDWARD P. WARNER, Editor

Volume 11 .. . March 22, 1936 .. . Number 11



Introduction

IT IS LESS THAN an month since our first structural issue was launched, but things happen very rapidly in the aeronautical world. Six months is more than time enough for getting out of date, so here is the structural record again, modernized and amplified.

It is not merely brought up to date from last October. Thanks to the time available for deliberation upon the results of our earlier effort, and thanks also to much appreciated suggestions from many friends, much has been added of which the earlier attempt felt no need. Some wholly new material has been secured from official sources. Some of that which was previously available has been given more exhaustive and clearer interpretation. Finally, we have made inquiries of our own to supplement the official data.

Questions upon operations have been addressed to all the flying schools, airports, airplane manufacturers, and transport lines in the country. To the thousands of individuals and organizations that have returned these questionnaires, we must make individual acknowledgments, but on our own behalf and as that of our readers we take this opportunity of thanking them collectively for the trouble that they took. We hope that each of them will extract enough of personal interest from the collective presentation and interpretation to recognize his fair share apart over his own contribution.

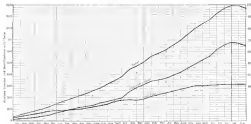
It was with more little timidity that we first presented a structural issue, and with a frank expectation that misfolded errors would be discovered. A few were pointed out to us, and we have found a number far ourselves, but it is a great satisfaction to be able to report that most of them proved to be of minor significance. Our report that errors be brought to our attention still stands, but we no longer unduly considered to hope that they will not be very numerous or serious.

The aircraft industry has been moving and changing with extraordinary rapidity in recent months, but that state of flux does not lessen the value of accurate data. It does it enhance their significance. When the ground is shifting under our feet with bewildering swif-

dom, a dollar record is an expense and a printed and numbered record of the existing state of affairs are first requests to which to cling.

There remains only the pleasant obligation of repeating and extending the list of acknowledgments presented last October. Without the most generous assistance from both official and non-official sources it would be impossible to prepare such a record. Especially prominent is our indebtedness to the officials of the Aeronautics Branch and the Aeronautics Trade Division of the Department of Commerce, to those of the Aeronautical Chamber of Commerce, and to the personnel of the National Advisory Committee for Aeronautics. We should like to enumerate individually those who particularly helped us, but the list would prove fortuitously long and here they would be sure to be incomplete. The War and Navy Departments, the Western Division of the National Aeronautics Association, and the Canadian civil aviation authorities have been generous in supplying data concerning their own activities. In a number of cases the efforts of governments and of air bases in European and other foreign countries have been good enough to furnish us with special reports. Among published volumes devoted exclusively to air, aviation should be made of the yearbooks of the Aeronautical Chamber of Commerce, "The Air Journal of the British Empire" and the several issues of "L'Aviation Aéronautique." Among official far apart documents the annual reports on civil aviation of the British Air Ministry, the Annuaire Yearbook of the League of Nations, "Deutscher Luftverkehrsmarkt" and the "Statistik der Luftverkehrsmittel" have been particularly helpful.

For the assistance drawn from all these sources and others we are deeply appreciative, but only in a few instances has any material been given by direct transcription from any official document. The form of presentation and the interpretation remain our own. For any errors that may have been introduced there, as far as any merit that they possess, we must accept the full responsibility.



Monthly licensing and identification data. Note: The upper curve is based on licenses in force, the lower one on identification made. A peak or valley in the lower curve therefore shows the effect in the upper one only after an approximate time lag corresponding to the time needed for issuing a license. This shows again in the curve of licenses applied for since the beginning of the year is appreciably out of phase. Yet a sharp increase in the last two years has led to a more or less increase in the quantity of license applications over the corresponding month of a year earlier.



Periodic Airplane License and Identification Data

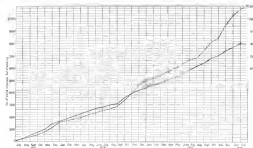
Quarterly Date	Licenses Valid	Identifi- cation Valid	Total Licenses and Identification	Date of License in Three Months	New Licenses Applied for in Three Months	New Identification Applied for in Three Months
June 30, 1927	50	19	69	8 341	—	—
Sept. 30, 1927	208	117	325	8 713	—	—
Dec. 31, 1927	50	33	83	8 430	160	50
Mar. 31, 1928	1,126	1,110	2,236	8 138	232	321
June 30, 1928	1,860	1,136	2,996	8 142	685	450
Sept. 30, 1928	1,908	1,019	2,927	8 123	285	179
Dec. 31, 1928	321	139	460	8 430	451	140
Mar. 31, 1929	1,263	2,067	3,330	8 430	55	50
June 30, 1929	1,564	1,605	3,169	8 111	1,714	1,118
Sept. 30, 1929	1,416	2,000	3,416	8 144	2,114	910
Dec. 31, 1929	1,000	1,099	2,099	8 430	1,140	540
July 25, 1930	1,341	1,114	2,455	8 111	1,014	579

*Two months only.

Periodical Records of Pilots' and Mechanics' Licenses

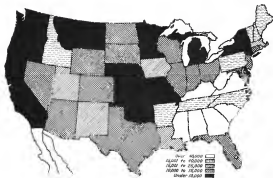
Quarterly Date	No. of Pilot Licenses Valid	No. of Mechanics Licenses Valid	No. of New Pilot Licenses Applied for in Three Months	No. of New Mechanics Licenses Applied for in Three Months	No. of New Pilot Licenses Applied for in Three Months	No. of New Mechanics Licenses Applied for in Three Months
June 30, 1927	111	90	—	—	—	—
Sept. 30, 1927	142	26	—	—	—	—
Dec. 31, 1927	1,023	1,670	1,320	—	—	—
Mar. 31, 1928	1,093	2,390	651	240	100	100
June 30, 1928	2,116	3,711	1,311	2,310	100	100
Sept. 30, 1928	1,140	2,141	1,411	1,411	100	100
Dec. 31, 1928	2,111	3,711	1,411	1,411	100	100
Mar. 31, 1929	2,111	3,711	1,411	1,411	100	100
June 30, 1929	2,111	3,711	1,411	1,411	100	100
Sept. 30, 1929	2,111	3,711	1,411	1,411	100	100
Dec. 31, 1929	2,111	3,711	1,411	1,411	100	100
July 25, 1930	1,100	2,100	1,400	1,400	100	100

*Three figures are for two months only: January and February, 1930.



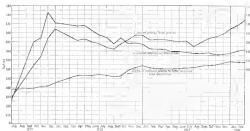
Record of the increase of pilot and mechanic licenses and student permits. Figures again show the increase of pilot and mechanic licenses and student permits. Figures again show the increase of pilot and mechanic licenses and student permits. Figures again show the increase of pilot and mechanic licenses and student permits.





Population per Licensed or Identified Airplane, by States

Estimate of licensed and identified planes given and received. For the first time since licensing began with establishment, the plane given the license is more than two per cent. Within the past three months a hundred for the first time, the licensed planes have come to out-number the states by identified ones but more than two to one.



Number of Establishments with Apparent Product of

	Less Than \$1,000	\$1,000 to \$2,500	\$2,500 to \$5,000	\$5,000 to \$10,000	Over \$10,000
Year	1934	1935	1936	1937	1938
1934	4	4	5	1	1
1935	2	2	3	1	1
1936	4	4	5	1	1
1937	2	2	3	1	1
1938	4	4	5	1	1

1938*

(*) given to other product or sub-establishment, as shown by value, to avoid double-counting by reporting on finished item. When available from Bureau of Census, Bureau of Economic Warfare, showing the number of establishments by product or number of wage earners in establishments by value of production for 1937.

Number of Establishments Employing

Year	Total Establishments	1-9 Wage Earners					10-19 Wage Earners					20-29 Wage Earners					30-39 Wage Earners					40-49 Wage Earners				
		1934	1935	1936	1937	1938	1934	1935	1936	1937	1938	1934	1935	1936	1937	1938	1934	1935	1936	1937	1938	1934	1935	1936	1937	1938
1934	4	4	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1935	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1936	4	4	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1937	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1938*	4	4	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
1939	10	10	10	12	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
1940	13	13	13	15	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
1941	15	15	15	18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
1942	17	17	17	20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
1943	19	19	19	22	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
1944	21	21	21	24	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
1945	23	23	23	26	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
1946	25	25	25	28	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
1947	27	27	27	30	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
1948	29	29	29	32	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
1949	31	31	31	34	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
1950	33	33	33	36	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
1951	35	35	35	38	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	
1952	37	37	37	40	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
1953	39	39	39	42	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
1954	41	41	41	44	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	
1955	43	43	43	46	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
1956	45	45	45	48	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	
1957	47	47	47	50	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
1958	49	49	49	52	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	
1959	51	51	51	54	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
1960	53	53	53	56	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
1961	55	55	55	58	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
1962	57	57	57	60	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
1963	59	59	59	62	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	
1964	61	61	61	64	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	
1965	63	63	63	66	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	
1966	65	65	65	68	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	
1967	67	67	67	70	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
1968	69	69	69	72	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
1969	71	71	71	74	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
1970	73	73	73	76	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	
1971	75	75	75	78	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
1972	77	77	77	80	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	
1973	79	79	79	82	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	
1974	81	81	81	84	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	
1975	83	83	83	86	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	
1976	85	85	85	88	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	
1977	87	87	87	90	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
1978	89	89	89	92	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
1979	91	91	91	94	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	
1980	93	93	93	96	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	
1981	95	95	95	98	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	
1982	97	97	97	100	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
1983	99	99	99	102	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
1984	101	101	101	104	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	
1985	103	103	103	106	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
1986	105	105	105	108	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	
1987	107	107	107	110	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
1988	109	109	109	112	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	
1989	111	111	111	114	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	
1990	113	113	113	116	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
1991	115	115	115	118	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	
1992	117	117	117	120	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
1993	119	119	119	122	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	
1994	121	121	121	124	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	
1995	123	123	123	126	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	
1996	125	125	125	128	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	
1997	127	127	127	130	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
1998	129	129	129	132	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
1999	131	131	131	134	62																					

*The establishment is from compiled by the Census Bureau showing number of employees by size of plant for 1934 to 1937.

Personnel

Year	Total		Clerks
	Employees	Officers	
1914	400	0	42
1915	400	0	42
1916	400	0	42
1917	400	0	42
1918	400	0	42
1919	400	0	42
1920	400	0	42
1921	400	0	42
1922	400	0	42

*Wages for 1938 are not available.

Factory Data

From Census of Manufacturers

Summary of (Aircraft) Manufacturers Census for the United States

Year	No. of Establishments	Wage Earners (Gov. Ind.)	Average No. of Wage Earners per Establishment		Wages	Total for Country	Cost of Materials	Value of Products	Value Added by Manufacturers	Sales for Year	Per Cent Which Shipments Form of Shipments
			1934	1935							
1934	14	603	11	114	\$1,14,827	187	\$15,408	\$13,100	\$19,070	100	100
1935	16	1,143	114	114	\$1,14,827	1,143	\$1,143	\$1,143	\$1,143	114	114
1936	20	1,173	114	114	\$1,14,827	1,173	\$1,173	\$1,173	\$1,173	117	117
1937	24	1,173	114	114	\$1,14,827	1,173	\$1,173	\$1,173	\$1,173	117	117
1938	44	1,173	114	114	\$1,14,827	1,173	\$1,173	\$1,173	\$1,173	117	117
1939	50	1,173	114	114	\$1,14,827	1,173	\$1,173	\$1,173	\$1,173	117	117
1940	126	1,173	114	114	\$1,14,827	1,173	\$1,173	\$1,173	\$1,173	117	117

(1) Including cost of fuel, electric power and shop supplies.

(2) Value of products less cost of materials.

(3) Total, average percentage of factory production equipment.

(4) Not called for in schedule.

(5) The above values in whole approximate value shown.

Classification of Engines in Licensed Places as of Jan. 15, 1930

[illegible]

*The engines included in this item are not repeated under the descriptions of the Wright engines. The model is unknown, but it is presumed that the majority are 70's.

TAKING THE LIST of losses as a whole, the war surplus groups still play an outstanding role. The ONS alone accounts for 48 per cent of the total number, the Higgins for four per cent more. As for the Liberty, that survives only in the places of two transport companies, and in a dozen scattering markets outside their possession. Altogether, the war surplus types make up 44 per cent of the whole.

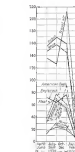
Nevertheless, they are on the high road to extinction. The rapidly increasing ratio of new-productions requests to airplanes built, already noted on page 328, is a sure sign of the times. The tables above and to the right confirm another. When our first statistical issue appeared, based on data only six months earlier than those used here, the war surplus ratio, four to four per cent, was 89. During the months from April to June last year the new-year-olds types contributed 43 per cent of the new business. In succeeding months the percentage rose steadily to 57, 55, 57, 55, 57, 57. Another eighteen months should see the virtually total disappearance of the war types from new airplanes.

Much of what has been said elsewhere concerning irregularities of geographical distribution of airplane applies also to engines. The war surplus engines, and the cheaper and smaller of the new types, tend to accu-

realize in the state where great concentration of wealth is around but where flying has become a recognized utility, is practiced in the best economic terms available. In Nicaragua and Iowa, to select two examples states with not many airplane factories, the QNS still makes up more than 50 per cent of total registrations. In Delaware and the District of Columbia it is well under 30

Local patriotism, or the hope that better service can be secured from a factory near at hand, are less potent influences in the selection of engine line of airplanes. The engine commonly goes along with the ship. Nevertheless, even the engines tend to deviate from a nationally uniform appearance in some cases.

The periods between time for airplanes, on the opposite page, are most striking for their reduction of the seasons with which some of the largest producers have used the technique of fall and spring to adjust themselves to it. Thus, the six miles of planes of each of which 175 or more were between January and April and the end of the year showed 57 per cent of all the licenses issued from April to June, 46 and 42 per cent in the next two quarters, and only 29 per cent in the current January and February. The winter production has been responsible for most of the increase in license during the last three months of the year.



Licenses Recently Granted, by States

Students of piano learned to make and sustain chords in the first year.

	to June 1900	to July 31st 1900	Oct. 1st to Nov. 30th	Total 1900	Jan. 1st to Nov. 30th	Total 1901
<i>Males</i>						
American English	50	59	65	174	14	188
Assorted	11	20	—	31	—	31
Arabic	—	11	24	35	—	35
Aryan	10	20	14	44	4	48
Chinese	—	—	12	12	—	12
Dead	8	10	10	28	2	30
German	15	20	20	55	34	89
Grecian	20	14	10	44	—	44
Chalcholan	40	26	40	106	12	118
Common Aryan	52	40	—	92	134	226
Chinese	28	40	10	78	—	78
Cyphlolean	100	171	140	411	90	501
Common Aryan	17	46	—	63	—	63
French	10	26	7	43	9	52
Italian	18	23	30	71	9	80
Latin	13	13	7	33	—	33
Poland	80	19	21	120	3	123
Central Asian	—	—	—	—	—	—
Arabic	12	27	40	79	11	90
Arabic	9	25	33	67	9	76
Arabic	8	30	—	38	—	38
Malay and W. African	24	29	40	93	13	106
Malay and W. African	9	25	16	50	13	63
Non Standard	12	12	17	41	9	50
Non Standard	—	—	23	23	—	23
<i>Female</i>						
Porter	1	10	51	62	3	65
Porter	11	14	7	32	3	35
Porter	11	34	—	45	—	45
Shirazi	10	7	17	34	11	45
Arabic	8	16	47	71	14	85
Arabic	10	20	21	51	—	51
Arabic	14	44	—	58	7	65
Arabic	19	26	26	71	7	78
Arabic	19	26	26	71	7	78
Arabic	20	10	10	40	51	91
Arabic	17	14	34	65	30	95
Arabic	17	14	34	65	30	95
Arabic	22	10	10	42	—	42
Total	1,463	1,826	1,901	5,190	543	5,733

ASKING OUT of the licensed airplanes by makers and points of production serves a dual purpose. It approximates a revelation of total production figures, minus exports and minus the planes which may already have been eliminated by crash. It furnishes the data, also, and this is more important for a survey of the rate at which airplanes disappear from the scene for

So far, the analysis of recent production is concerned, the figures that are given for the individual models closely resemble those for factories issued from April 1, 1929, to March 1, 1930 inclusive, as tabulated on page 15. It is only a half dozen instances among leading models in which the figures granted in that period differ materially from the figures for the factories involved or machines built in 1929. In these few cases the values issued are sometimes in excess of the apparent 1929 production, the discrepancy in one instance probably being due to the inclusion of a number of imported planes built abroad during 1929 in the others to the carrying over of production figures from the previous year to the earlier construction. Of the 120 factories producing the largest total number of planes licensed right were also among the two largest producers in 1929, so far as these license figures indicate. Of the two manufacturers taking the largest number of licenses on their 1929 production (up to January 15), seven are also among the two largest producers in 1929, and one of these, and all on the active list. The other three are

comparative newsmen. Of the seven who are among the leaders in both years five turned out more machines in 1939 than at present stand on their 1938 roster.

Counting such companies under a consolidated financial control, such as Caterpillar-Wright, United Aircraft, or Detroit-Aerotec Corporation, in a single unit, it develops that two companies were responsible for the construction of 40 per cent of the total number of airplanes licensed on January 15, five companies for 86 per cent, and six companies for 73 per cent. On the basis of the production schedule the corresponding figures are 40, 54, 67, 74, 81, and 86 per cent. The highest probability has been due to some of the large companies being better judgment than the average of the small ones in scheduling of production last fall but whatever the reason there is no indication in these figures of even the faintest tendency towards the concentration of the entire industry in the hands of a few big producers. Of all the automobiles made in the United States, a little more than 80 per cent were made by five companies (counting the Buick, Oldsmobile, Pontiac, Cadillac, and Chevrolet) and more than 90 per cent from ten. The airplane industry is much freer than that from monopoly.

Particularly interesting is the analysis of these data in terms of rate of disappearance of planes, either by crash or by scrapping for obsolescence. A first clue is given by an examination of the percentages listed at the bottom of the table, showing only 12 per cent of the 1938 production still as the latest lot, while 1927-1938, and 1929 are all grouped between 43 and 64 per cent. These figures are distorted, however, by the failure to allow for exports and by the number of machines produced but never delivered, a number which was very considerable in 1926 and 1927. A better matrix is to be obtained from the curves of value (shown outstanding on page 300).

12	179	44
13	179	44
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96	179	44
97	179	44
98	179	44
99	179	44
100	179	44

AVIATION
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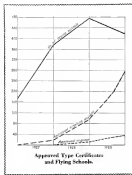
Engines Used on Licensed Airplanes of Certain Popular Makes

[illegible]

THE OXIS DIAGNOSTIC OX5 still accounts for a majority of the licensed open three-position phones. Of the eight machines of that class included in the table at the top of the page, seven show a direct majority for the OX5. In two cases, the figure runs to over 80 per cent war surplus engines on the machines still in service.

Aside from showing the status of the war engines, the most striking feature of the tabulation is its diversity. Leaving the Port and Polder out of consideration and assessing only the single-engined machines of moderate size, only one or two of the remaining fifteen makers show any close approach to standardization. In one case seven makes of engine each came in for over one per cent of the planes formed by a given maker, the war-time engines being thrown out of the reckoning entirely while in several instances the corresponding figure was from three to five.

TRY CLEVER at the right show the steady acceleration in the rate of granting approved type certifications, both for planes and for engines. No detailed analysis of the trends as shown in the bar charts, revealing correlations such as was given in the first statistical case, is being attempted this time. A very full study, beginning with the October 5th issue up to the end of 1928, was made in Lucien E. Neville's article, "The Tonad of Decrees in 1928," in *AVIATION* for February 1929.



Notes on Distribution

THE Department of Commerce and Chamber of Commerce do not collect for public circulation any data on the merchandising of airplanes, a questionnaire pertaining to merchandising methods was forwarded to all manufacturers. Returns were received from companies representing about 30 to 35 per cent of America's total production of commercial aircraft.

In their distribution for the coming year, the companies reporting planned to make very little use of factory representatives selling planes to the ultimate purchaser. That is, statistically, most of the types generally sold to individuals or to small business organizations. Transport planes are, of course, an entirely

special category, and are distributed almost entirely by direct sale from the factory. Confusing attention to individuals selling at under \$20,000, there is apparently an equal division of those between dependence upon dealers commissioning directly with the factory and dependence upon distributors who, in turn, will appoint dealers in their territory and take the responsibility for their activities.

If the larger companies, having a smattering of aircraft products to dispose of and working through a convoluted sales organization, be abandoned from consideration, a majority of the more important manufacturers are planning to keep the dealer directly in touch with the factory and eliminate the distributor as intermediary. At least one of the leading manufacturers is adopting this

practice for the first time in 1939, after having used distributors in the past.

In a question pertaining to national versus localized distribution, all of the manufacturers except two very small ones declared against local excess sales of sales efforts, and in favor of a nationally uniform distribution.

Of last year's output as reported upon eliminating the transport planes approximately 34 per cent was disposed of through distributors and dealers under their control, 6 per cent through dealers operating in direct liaison with the factory, 4 per cent through factory representatives in the field, and 6 per cent by direct factory sales. The indication is strong, however, that for the coming year the second of these figures with their pronounced gain at the expense of the first.

Only four manufacturers were able to give detailed information on the distribution of dealers in terms of the number of planes of which they disposed. Those four, of whom there are making plans for a year of \$3,000 to \$5,000 value, the fourth came in the \$10,000 class reported approximately 100 dealers. Of that number only 4 per cent had disposed of more than 20 planes each during the year. Seven per cent had sold from eleven to twenty planes each per cent from six to ten, 24 per cent from three to five, and 40 per cent had disposed to one or two planes only. Approximately 75 per cent of all dealers upon whom reports were made had done a gross business of less than \$25,000, with a pronounced gain increase on the small commission basis of less than \$5,000.

Approximately 75 per cent of the manufacturers reporting make it a practice to require a contract for a definite yearly quota from their distributors and dealers and demand a deposit of some sort on the projected amount of business.

As between open and closed dealer territory there was almost an even division of opinion, but among the most important of the independents not associated with any merger the open ter-

ritory had a clear preponderance. As these terms are used in varying senses, the questionnaire carried the explanatory note that "closed territory implies that in the event of any sales made from within that territory, through any channel, the distributor or dealer will still receive at least a substantial portion of his annual commission, being guaranteed against the invasion of all the dealers or of factory representatives." Presumably, it was in that sense that the answers were returned.

On the question of co-operative advertising, the manufacturers contributing to the dealer advertising campaign, there was again almost an even division of opinion, with a slight swing in favor of such a plan.

Discussion, it might have been expected, showed rela-

tively little variation. On the whole, the companies doing the largest business, and that most nearly uniform in territorial distribution over the country, allow the most liberal discussion. The actual figures quoted range from 20 to 25 per cent for distributors, and from 15 to 25 per cent for dealers operating directly with the factory.

Except for the larger holding companies, which have facilities for virtually operating their own finance corporations, a majority of the manufacturers do not provide any type payment plan. A few allow five payments on demonstrators to the distributors and dealers, however, while a few others make a financing arrangement under their own supervision general in application both for retail and wholesale distribution.

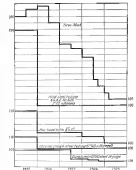
MATERIALS

THE WAY of indicating the trend of prices of certain raw materials and parts important in the fabrication of aircraft, expenses have been made from a number of manufacturers and supply houses. The results are plotted herewith. A number of manufacturers were asked to furnish actual prices for use in making up a trend chart, but did not wish that the actual wholesale prices be published. All the curves have been plotted in terms of percentage changes, taking the present price as the base and as 100 in each case. Each vertical division in the chart represents five per cent of the present price, and the curves have been spaced arbitrarily to avoid confusion and overlapping. The prices at the beginning of 1935, on a scale of 100 for the price level five years later, are marked in at the left-hand end of each curve. For the data upon which the curves are based we are indebted to the Swinerton Tubing Company, the American Company of America, the Aero Supply Manufacturing Company, the Goodrich Tire & Rubber Company, and the U. S. Rubber Company.

The specific article upon which prices were requested is defined upon the curve in each instance. Sizes and gauges of extrusions mentioned were selected, and the prices quoted were those which would have to be paid by a manufacturer of airplane buying in large quantities.

To those who have not followed the price trend directly, it will be an occasion for some surprise that the rubber run has been much more marked on red steel tubing which was a product of extensive industrial expansion outside of aircraft factories, than upon direct analysis of aircraft materials, the development of which was fostered almost purely on behalf of an aeronautical application.

The two most important extrusion materials, in fact chrome molybdenum tubing and sheet duralumin, both show very modest reduction of less than one per cent in the last five years. Parts which are made up solely for aeronautical purposes, naturally are more affected than the raw materials, and the price of tires, after a brief period of inflation close to the 1925 figure, has dropped over thirty per cent in three years. (Airplane tires) were an embellished by a specified size of low load holes made to A.N. standard, has come down 20 per cent in



Material Price Trends
Each vertical division represents a change of five per cent; the present price being taken as the base.

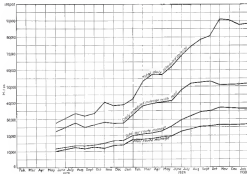
four years. Between 1932 and 1936 there was a much more abrupt drop, amounting to over sixty per cent in some cases, in hardware prices. Much of the reduction in sheet material has been the result of standardization, the work of the Army Navy conferences and the Society of Automotive Engineers having very much reduced the number of sizes and types of parts that have to be carried in stock, with corresponding savings both in production and in distribution costs.

Aircraft and Pilots

(See p. 568)

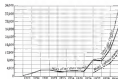
	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934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UNITED STATES *Air Mail* AND *Passenger* Transport



Airway and Operation Mileage for Last 19 Months

Month	Miles at Mail Service	Total Miles of Airways	Airplane Miles		Total Airplane Miles	Month	Miles at Mail Service	Total Miles of Airways	Airplane Miles		Total Airplane Miles
			Miles	Subsidized					Miles	Subsidized	
Nov. 30, 1933	10,568	11,963	10,448	30,108	Nov. 1, 1934	19,121	20,384	14,120	42,181		
July 1, 1934	10,131	11,194	27,945	33,817	June 30, 1935	25,143	25,527	49,048	49,949		
Aug. 14, 1934	11,121	11,133	27,269	33,842	July 31, 1935	26,044	27,276	52,532	52,779		
Sept. 30, 1934	11,513	11,499	29,786	34,972	Aug. 31, 1935	27,149	28,194	55,611	56,720		
Oct. 14, 1934	12,077	14,741	29,779	45,482	Sept. 30, 1935	27,334	30,113	58,349	60,151		
Nov. 30, 1934	12,158	14,485	27,134	44,115	Oct. 31, 1935	28,744	33,846	61,843	63,163		
Dec. 15, 1934	12,705	15,867	27,668	47,049	Nov. 30, 1935	29,277	36,707	58,199	61,454		
Jan. 14, 1935	17,470	19,141	32,815	43,170	Dec. 31, 1935	30,197	36,448	61,235	63,199		
Feb. 28, 1935	17,638	20,134	33,615	43,346	Jan. 1, 1936	30,197	36,448	61,235	63,199		
Mar. 30, 1935	18,874	21,771	35,275	45,874	Jan. 1, 1936	30,197	36,448	61,235	63,199		
Apr. 30, 1935	17,153	22,739	36,472	47,427							



Miles of U. S. Mail Airways

Oct. 14, 1934	2,611	Oct. 14, 1934	1,614
Oct. 14, 1935	709	Oct. 14, 1935	3,808
Oct. 11, 1935	7,100	Oct. 11, 1935	8,618
Oct. 14, 1935	2,121	Oct. 11, 1935	14,050
Oct. 14, 1935	2,758	Oct. 11, 1935	14,050
Oct. 11, 1935	2,940	Oct. 11, 1935	20,107

Development of Airmail Service

Year	Air Mail Mileage Flown	No. of Flights	People Carried
1933	14,644	40,100	40,100
1934	144,940	340,000	340,000
1935	1,011,304	1,011,304	1,011,304
1936	1,420,136	1,420,136	1,420,136
1937	1,664,432	1,664,432	1,664,432
1938	1,888,111	1,888,111	1,888,111
1939	2,144,433	2,144,433	2,144,433
1940	2,344,433	2,344,433	2,344,433
1941	2,544,433	2,544,433	2,544,433
1942	2,744,433	2,744,433	2,744,433
1943	2,944,433	2,944,433	2,944,433
1944	3,144,433	3,144,433	3,144,433
1945	3,344,433	3,344,433	3,344,433
1946	3,544,433	3,544,433	3,544,433
1947	3,744,433	3,744,433	3,744,433

*Only airmail and not mail carried through RPS and domestic. Up to that time airmail had been used but had been carried to air.

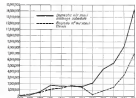


Air Mail History by Month

that opened new passenger routes and doubled and tripled the schedules all over the country. This year it has manifested itself in its natural form.

Apparent discrepancies between the chart on the lower right-hand corner of this page, with its corresponding table, and the graph and data on the opposite page are accounted for by the fact that in the latter chart of the foreign air mail routes under American control. Within the year 1935 the miles of mail and airmail were almost doubled, but most of the increase was outside the territory of the United States.

The graph in the left-hand column shows the scope of the airmail service to have expanded steadily since contract operation was started in 1933. There



Domestic Air Mail—Air Mileage and Traffic

has also been steady and unceasing increase in passenger from the time when the public had a chance of determining the passenger for itself. Until July 1, 1934, the amount of mail carried was governed by the arbitrary decision of the Post Office Department, which looked in ordinary first-class mail matter to the

Civil Aviation in the United States

[illegible]

to less than 60 per cent smaller than the most robust individual airplanes, or transport only, and therefore place-airframe, over a route by other means of air.

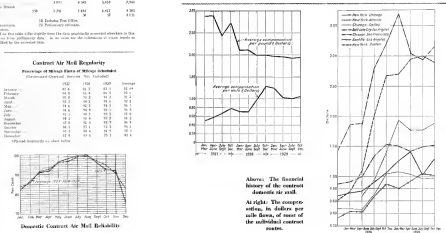
The data on the opposite page need not be analyzed in detail, as they parallel very closely in abbreviated form the statistical history of the air mail mounted in AVIATION for November 3, 1929. During the steady increase in patronage of the service, the doubling up of schedules, together with the opening of new routes, and during the last quarter of 1929 for the first time in the last three years, the average compensation per mile flown by the contractors showed a decline from the corresponding figure of the previous year. Of the six major routes separately listed on page 577, however, only those between Salt Lake City and New Orleans and between Chicago and Dallas showed a decline in the average rate. The latter two routes are the shorter routes of those between principal, well-served cities and are

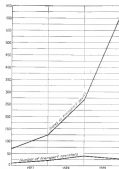
One of the disturbing influences for the last quarter of 1929 was the unprecedentedly foggy weather over the greater part of the country, which gave the air such, as shown by the curve in the lower right-hand corner, an abnormally low record of reliability in October, and especially in December. With the exception of this last quarter the reliability records have remained reassuringly true to the average seasonal curve throughout the last three years.

Mail Carried by Routes for 1924

Route	City	Year	Per Cent of Total Mails, Average					Increase		
			Mails Trayed per Month	—Miles of Routes—	Subsidized	Total	Weight per Parcel	Annual	Compared to	
				and fully	Unsubsidized			Costs	Costs	
				Subsidized	Unsubsidized			Costs	Costs	
								Costs	Costs	
1	Boston-New York	1884	556,198	10,917	80	14,625	100	\$494,719	18	Orlando
2	Chicago-New York	1884	307,174	10,718	80	14,625	100	\$494,719	18	Orlando
3	Chicago-New York	1884	1,108,672	11,137	83	100	400	\$1,108,672	10	Madison
4	San Francisco-Chicago	1884	344,393	11,137	83	100	400	\$1,108,672	10	Madison
5	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
6	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
7	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
8	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
9	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
10	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
11	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
12	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
13	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
14	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
15	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
16	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
17	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
18	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
19	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
20	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
21	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
22	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
23	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
24	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
25	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
26	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
27	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
28	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
29	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
30	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
31	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
32	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
33	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
34	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
35	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
36	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
37	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
38	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
39	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
40	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
41	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
42	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
43	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
44	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
45	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
46	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
47	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
48	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
49	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
50	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
51	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
52	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
53	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
54	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
55	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
56	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
57	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
58	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
59	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
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62	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
63	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
64	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
65	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
66	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
67	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
68	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
69	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
70	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
71	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
72	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
73	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
74	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
75	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
76	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
77	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
78	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
79	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
80	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
81	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
82	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
83	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
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85	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
86	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
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98	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
99	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
100	San Francisco-Chicago	1884	311,098	11,137	83	100	400	\$1,108,672	10	Madison
Total		1884	18,181,818	13,856,521	11.2	1,000,000	100	\$18,181,818	10	Madison

for the following information, provided from Seattle to Portland:





THE TWO CHARTS at the top of the page illustrate the predominant tendencies of American air transport during the last three years. There has been a rapid increase in the amount of equipment carried, combined



Air Transport Accident Record

This results per 1000 miles flown

Year	1937	1936	1935	1934	1933
1937	1.76	1.62	1.45	1.44	1.40
1936	1.85	1.62	1.45	1.44	1.40
1935	1.85	1.62	1.45	1.44	1.40
1934	1.85	1.62	1.45	1.44	1.40
1933	1.85	1.62	1.45	1.44	1.40

Average 1933-1937 1.40 Average 1934-1937 1.40

For passenger record see table on page 579

with engines which have actually reduced the number of independent operators. Passenger transport, after being an insignificant part of the total until two years ago and having increased less than 50 per cent in 1937, suddenly multiplied sixfold in the next year, and more than tripled again in 1939. Although there are no accurate data on the receipts from passenger carrying, a rough estimate would make the income from passenger business two per cent of the total for American air transport in 1937, fifteen per cent in 1938, and 22 per cent in 1939. For the aggregate traffic load in business, and including passengers carried en masse, the corresponding figures would be about 38, 58 and 65.

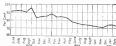
The next three pages show in detail the development of passenger and mail service within the United States. Routes shown by line lines were served at the period specified by a single plane each way each day. The heavy lines indicate two or more services daily. Where there are more than two, the actual number is indicated

on the map, with an arrow leading to the route. On January 1, 1938, the record was held by the San Francisco-Los Angeles run, with seven scheduled daily passenger services in each direction. Los Angeles-San Diego (or Tinian), Miami-St. Louis, and Tulsa-Oklahoma City came next with six each.

The coverage is not broad enough to make the records of accident fatalities, as presented on this page, of very much significance for individual years. A curve of the annual averages would be violently irregular. Periods of three or four years, however, smooth out the irregularity enough to show a definite trend.

In the period from 1918 to 1921 the equipment was under the average, was totally unorganized and fatality rates were correspondingly high.

The average pilot fatality rate from 1922 to 1935 was less than one-third the average for the first four years, in spite of the fact that night flying was being introduced in that period. The last four years show another 40 per cent reduction, although some routes of exceptional difficulty were opened and there was a great increase of night operation. The percentages of regularity for the most four year periods, as shown by the average proportion of scheduled mileage flown, were 82.7, 95.6 and 92.3.



Percentage of total route mileage on which mail is carried.



Passenger Routes in Operation as of Jan. 1, 1928



Passenger Routes in Operation as of Jan. 1, 1938

For explanation, see text on page 578



Domestic Air Mail Routes in Operation as of Jan. 1, 1926



Domestic Air Mail Routes in Operation as of Jan. 1, 1929



Domestic Air Mail Routes in Operation as of Jan. 1, 1928



Domestic Air Mail Routes in Operation as of Jan. 1, 1930

For explanation, see text on page 275

Airport Analysis

Based on questionnaire and data in 21 total parts.

Total investment reported: Commercial, \$244,495; Municipal, \$97,911; Total \$342,406.

Commercial	Municipal	Total	Commercial/Municipal	Total
Field capacity reported:	38	31	(38)	
Number operating with an area of at least 2,000 sq. ft. (100 ft. by 200 ft.)	38	31	91	
*Note: All further numbers in based on this group only.				
Number operating land frontage:	24	42	32	
Number having an area of at least 340 acres.	2	14	81	
Number having an area of at least 400 acres.	5	3	14	
Number having a longest runway of at least 1,000 ft.	19	34	10	
Number having a longest runway of at least 1,000 ft.	3	12		
Number having a total length area of at least 10,000 sq. ft.	13	36	42	
Number having a total length area of at least 10,000 sq. ft.	3	12	26	
Number having a total length area of at least 10,000 sq. ft.	1	5	8	
Number having an average of at least 10 runways	12	23	16	
Number having an average of at least 10 runways	2	17		
Number having an average of 20 or more runways	1	4	1	
Number having an average of 20 or more runways	13	40	42	
Number having an average of 20 or more runways	19	29	43	
Number having an average of 20 or more runways	25	31	59	
Number having an average of 20 or more runways	12	22	48	
Number having an average of 20 or more runways	11	20	49	
Number having an average of 20 or more runways	11	21	42	
Number having an average of 20 or more runways	4	1	1	
Number having an average of 20 or more runways	8	27	31	
Number having an average of 20 or more runways	4	6	12	
Number having an average of 20 or more runways	11	16	34	
Number having an average of 20 or more runways	3	19	34	
Number having an average of 20 or more runways	33	44	31	
Number having an average of 20 or more runways	4	15	11	

*Note: In these parts are very incomplete, many airports having no details.

Especially satisfactory returns from the airport questionnaires were received from the municipal airports. Among those reporting were Oakland, Chicago, Cleveland, Buffalo, Detroit, Boston, and a number of others of special importance. Returns on commercial fields were less complete. The figures would therefore naturally show a slight bias towards the municipal side.

Making all allowance for that, however, the apparent discrepancy between the two groups remains surprising. For the commercial fields reporting the total investment on development, the average amount was only \$616,000. For the municipal field it reached \$470,000. Of the nine fields and regularly on a basis of operation for fifty or more airplanes, eight were municipally operated.

The most interesting features of the returns on the questionnaires were the reports on operating policies and nature of operations. It appears that of the 89 fields large enough to be reckoned as private airports and used on a calculation of general tendencies, 85 per cent of the commercial operators and 55 per cent of the municipal have constructed hangars and operate them directly under field management. Seventy per cent of the commercial fields and 28 per cent of the municipal group operate their own repair shops, with the corresponding percentages for the direct use of fuel

by the field management are 70 and 45. About 40 per cent of the municipalities appear to make it a policy to keep clear of all direct operation of utilities, confining themselves with providing the landing areas. It is a little surprising to find about 90 per cent of the municipal fields have an operating "shop" service directly, but it is presumed that in most cases that is a semi-private venture of the airport authority rather than one for which the municipality itself takes the responsibility.

The charging of landing fees on all planes at a source of revenue, a municipality popular among private operators of airports, but which is popular in the United States. Only one of the 89 airports makes any such charge.

The results of a wide-scale of operation speak for themselves. The financial returns were naturally very incomplete. Of the 50 fields that did report on revenue, 48 reported at least a part of it from hangar rentals. Only two took in as much as \$2,000 from that source. The next most popular item was the sale of fuel, which contributed to 28 cases, but only five net to \$30,000 or more. Receipts for mechanical services were even less. Out of a total of 13 commercial and 31 municipal fields giving enough financial data to make a comparison possible, seven and, or, 54 per cent and 19 per cent, respectively, showed an operating profit

The increase of airport construction has been very steady. Municipal airport construction had its first boom in 1924 and 1925, followed by a temporary slowing down. The Lindbergh flight, and especially Colonel Lindbergh's subsequent tour of the country in the interest of a airport development, boosted off the enthusiasm of public authorities once more, and construction proceeded at a steadily accelerating rate up to the middle of 1928, the record being made on the first half of this year with the opening of an average of nearly five new airports every week for six months. At that point there came an abrupt check, and municipal construction has since proceeded at a much slower rate. The municipal governments of moderate "size countries" were reached during the period immediately following Colonel Lindbergh's trip, the other departments proposed by the Guggenheim Fund, and the early campaign by the Department of Commerce. City committees that survived 1927 without appearing for aeronautical facilities have been hard to persuade.

Commercial construction shows a different trend. That, too, after a period in the late 1920s was not helped by the Lindbergh construction of 1928. The increase in the number of commercial fields was less rapid than that in municipal airports, and the governmental fields outnumbered the private ones for the first time in the spring of 1928. Nineteen twenty nine showed a reversal. The public took into the stock market its greatest of aeronautical securities made the financing of new airports comparatively easy. While municipal construction was still going ahead, additions to the number of commercial fields

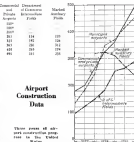
were being made at about three per week, and they again took the lead in number, just a year after they had lost it. But the present time the commercial fields outnumber the municipal ones by approximately ten per cent, after having been eight per cent behind eighteen months ago.

The Department of Commerce auxiliary fields have increased in number at a somewhat variable rate. The most rapid progress was made in the latter part of 1928, corresponding to the completion of preparation for flying on the western part of the transcontinental route. In the meantime, marked auxiliary fields have been steadily decreasing in number.

FLYING SCHOOLS

As there is no official publication of data on flying schools other than a rough annual estimate of their total number, information upon their operations was sought directly by the circulation of a questionnaire to all schools to which the admission could be secured. Reasonably full replies were received from schools representing approximately 25 per cent of the present total flying activity of the United States. While this return is by no means a satisfactory basis for a measure of total activity, it does serve to indicate certain trends in school operations.

As a basis for a statistical presentation the schools' replies were divided into three groups. Group A, B, and C. Group A schools are those which have been approved by the Department of Commerce, or, in two or three cases, have not yet been approved but deserve the highest rating by virtue of their long and successful record and generally good reputation. Group B is made up of schools that are operating on a reasonably large scale and that are financially known to the aeronautical world, while group C includes those of very brief experience, of small and purely local activity,



or with a record characterized by great irregularity of operations. Certain of the results for the three groups are tabulated on the next page.

The figures given speak for themselves. It is apparent that a very large proportion of the so-called flying schools of the United States are actually confining themselves to giving small amounts of instruction in connection with the purchasing of airplanes or with aerial service, activities, and find in the nature of things any of their cannot maintain any proper equipment for advanced training. That, out of the twenty schools listed in group C, only eleven are even attempting to give a transport course. With an average of seven students enrolled during the year and only eight graduates, and with 80 per cent of the total enrollment in the private flying course, they obviously cannot maintain themselves upon the receipts of flying instruction alone. The rather better relationship between the number of students enrolled during 1929 and the number under instruction at any one time in group C can only be accounted for by the existence of a large class of students

in these small local schools who remain normally under instruction but allow the period of their tuition to stand out for one or several years. The normal number at work at any time during 1929 would, therefore, have shown a substantial carry-over from the conditions of previous years.

Although it is the prevailing impression that most students have their eyes fixed upon the transport license and are definitely working towards it, it is evident that the most elementary course remained dominant at least long enough to justify the total for 1929. Even in the highest group of schools, only seven per cent of the graduates had finished the transport course, while 60 per cent contented themselves with the general qualification. In the lowest grade the percentage had fallen to four and amounted to 80, respectively.

The total number of students enrolling in 1929 in all the schools rendering returns was 2,838, as against a total of approximately 30,000 student persons issued during the year. If all the holders of permits had actually enrolled for courses of instruction, our tabulations would represent only about fourteen per cent of the total, instead of 25 per cent as calculated on the basis of the experience of schools responding and the estimated proportion of those which failed to reply. The indication is strong that a very large number of student permit holders never even reached the point of formal enrollment in a school.

In the Class A schools each flying instructor was able to take care of approximately fifteen students on the average at the time of greatest activity. For individual

schools reporting, the ratio ranged from five to 42 students per instructor. The lower distributions of schools actually had fewer students per instructor than those in group A, but that is probably due to the fact that most of the instructors in the approved schools are employed primarily if not solely in that role, while in the small local schools they are likely also to be doing two work or demonstrating airplanes to prospective customers.

Particularly interesting are the figures pertaining to tuition charges. It is noticeable that the schools of longest experience and the best reputations, as a whole and of course with many individual exceptions, are prone to charge the highest rates, and also that they come nearest to standardization on fixed figures. Sixty per cent of the tuition charges quoted by the group A schools by volume are made available for the type of course under consideration, while for the Class C schools that had dropped to less than thirty per cent lying within that narrow range. Of course geographical factors entered to some extent, tuition charges being highest for schools located at expensive airports and for those which specialized in training for private owners. The actual range of prices among the group A and group B schools, ignoring group C, was from \$2.85 to \$5.50 for a transport course, from \$2.50 to \$5.60 for a limited commercial, and from \$3.50 to \$7.50 for a private.

Furthermore, there was no general agreement about the relative amount of work involved in giving the second courses. The ratio of transport to private tuition ranged for the various schools reporting ranged (in groups A and B only) from 5.1 to 39, although a majority of the well-established schools group very closely around eight for one ratio. The corresponding figures for the ratio between limited commercial and private ranged from 1.8 to 30, with 2.4 as the median.

Of particular interest were the replies returned by the school operators to the question relative to the distribution of their students' interest in aviation. While there was a wide range in the figures given, the differences usually had a logical explanation. Schools which specialized in transport courses and in affording easy time payments tend to attract all of their students (99 per cent in one leading school and 90 in two of three others) plan to become transport pilots, while the proportion appears to lay their own planes may be as low as one or two per cent. In schools run at an airport with a country club aspect or at a popular winter or summer resort, on the other hand, the proportion of would-be transport flyers may fall as low as 25 per cent and that of prospective private owners as high as 40. In extreme cases we felt it believed that more than 40 per cent of the students would be in the market for planes of their own.

There will be noted the slight tendency to increase of private ownership in progressing from the highest to the lowest group of schools. While that may be partly due to private owners preferring to take instruction from a single instructor in their neighborhood where it will imply a minimum of interference with their business, it seems more likely that most of the difference is due to over-optimism on the part of some of the small and comparatively inexperienced school operators. Study of the individual figures suggests that somewhere around twelve to fifteen per cent would be the most realistic estimate of those who plan private purchases.

N.A.C.A., N.A.A. AND Weather Bureau

THE STATISTICAL RECORD of the activities of the National Advisory Committee for Aeronautics points in evidence the growing dependence of the aircraft industry upon its work and the appreciation of its importance in Congress, as proved by steadily increasing appropriations. The scale of the work at Langley Field and the amount of money made available for the salary lists and for general maintenance there and in Washington, as well as at the Committee's Paris office, has more than doubled in the last six years. In the same length of time the demands for the published information prepared by the Committee have practically tripled in number. During the past year the total number of the Committee's separate publications and also the number originating in the research of its own staff have been apparently increased over any previous year.

Appropriations and Personnel of National Advisory Committee for Aeronautics

Fiscal Year	Total Appropriation	Employees at Langley Field Laboratory
1925	121,000	77
1926	367,000	77
1927	429,000	80
1928	549,000	85
1929	515,000	90
1930	610,000	95
1931	725,000	100
1932	850,000	109
1933	950,000	129
1934	1,045,000	139

Personnel of National Advisory Committee for Aeronautics

By Association					
Tabulated Reports	Tabulated Reports	Tabulated Reports	Reports Submitted Outside	Total Copies Received	
1925	35	35		35,000	
1926	11	30	13	12,000	
1927	12	31	13	13,000	
1928	27	30	43	30,000	
1929	19	17	30	14,000	
1930	25	25	30	14,000	
1931	18	26	32	31,000	

Tabulated Reports		Reports Submitted Outside	
Organized by Rank	By Others	Organized by Rank	By Others
Y & C A	10	Y & C A	10
1925	10	10	10
1926	8	10	10
1927	8	10	10
1928	24	10	10
1929	17	10	10
1930	17	10	10
1931	17	10	10

THE MEMBERSHIP of the National Aeronautic Association and the number of chapters active continue a steady though gradual increase. The control of our commercial contacts is among the Association's most important activities, and the number of events sanctioned as air pilots' interests served furnish a good index of the total air recreational sporting activity. We will be recalled, of course, that the F. A. C. is inactive on any level for all, and it is preposterous to any comparison with the sporting arena, also recognized for entry in a sanctioned contest, must be reserved only for the number of sporting business for 1929 ran more than 7 per cent beyond any previous year, while the total number of chapters sanctioned was well over double the previous year.

American AND World Records

Table 1: Class C Airplanes Returning to point of departure without refueling

[illegible]

Table 2: Class C2 Scenarios

[illegible]

Table 3: Light Plane Records

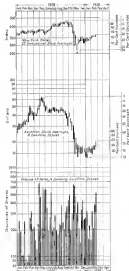
	India	Americas	World	Americas	World	Americas
Distance (Short Circuit) (mi)	100 100 to 250 250 to 500 500 to 1000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000
Distance (Main) (mi)	100 100 to 250 250 to 500 500 to 1000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000
Distance	100 100 to 250 250 to 500 500 to 1000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000	1000 1000 to 2000 2000 to 3000 3000 to 4000

Table 34: Light Plane Records

[illegible]

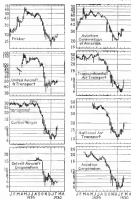
AERONAUTICAL *Finance*

1832 data compiled, and first printed, by H. B. Dewar.



Average prices on aviation securities and on miscellaneous industrial stocks and volume of trading.

AVIATION
March 22, 2000



Aviation security price ranges

AMONG the thirty odd aviation stocks actively traded in day by day through the organized exchanges, there is a small group of issues whose movements may be considered as supplying the key to the aviation security market. These stocks represent not only a complete cross-section of the industry, but fifty per cent or more of its entire capital investment. At these few dominant issues, no, so, most the industry

With the increase in the volume of trading in securities markets, as well as the number of stocks outstanding, it has become essential for the investor as well as the professional trader to enter situations on the few leading issues and to disregard movements in the larger number of unimportant stocks which make up the bulk of daily trading in an stock. Newspaper market pages now pose such day quotations on some forty or more different issues together with a quantity of uncorrelated financial data. So far as the trend of events is concerned the concerned professional trader is not concerned with the great majority of the trading in an stock market. The great portion of the trading in an stock market is concentrated in less than a dozen issues, and of these some half dozen or so set by far the most important.

Quite obviously an index of the movements of these leaders should prove a valuable measure as it would contain the essence of the market redistorted by irregular fluctuations in the minor issues. Such an index, covering weekly price changes and volume of sales, has been constructed and is presented here.

AVIATION
March 22, 1992

The idea of a group of stocks which can serve as an adequate measure of the rest of the market is not a new one. We are all familiar with the phrase "pivotal stocks," and frequently some small number of stocks achieve the distinction of a *reference*. Suffice it to say that we are not trying to name any would-be leaders in this sense. Neither does their selection for this index mean that we consider them the only relevant issues of real value. There are unquestionably many more. But, from the standpoint of past market behavior, the diversified and representative nature of the issues, the banking sponsorship and the desire of the public to know that this is a "fair" index will, at the present time, produce a fairly true picture of the basic trend in the American investment market in a relatively brief period.

OBVIOUSLY as the necessity for some accurate measure of the major causes of aviation security grows, it may be, however, up to the present no index of the leading issues has been available. The problem of constructing such an index necessitates: first, the selection of the issues to be included; second, the method of combining these issues into the index.

difficult, as it involves the classification of the stocks into those which are and those which are not the market leaders. Such a definite division is naturally avoided under the present conditions by letting themselves be preoccupied with the outstanding characteristics of such representative stocks as clearly: (1) a large normal volume of trading; (2) constant movement with the market; (3) the size and importance of the company, and (4) that the shares be listed on an organized exchange where daily quotations and sales volume may be obtained.

Because of the above named qualities, their normal volume of trading, the general regularity of their price fluctuations, the approximate similarity in the spread, and their representative nature, the following eight stocks have been selected for inclusion in the index:

Primarily Manufacturer
Carter-Wright
United Aircraft & Transport
United Aircraft Corporation
United Aircraft Corporation

Primarily Transport
USDC Corporation
International Air Transport
National Air Transport
The Connecticut of the America

Throughout the period here reviewed the transactions in these stocks easily furnished more than two-thirds of the total transactions in all seven issues. The average daily activity has been in excess of fifty thousand shares while the weekly volume has averaged over the past forty weeks, better than three hundred thousand shares weekly.

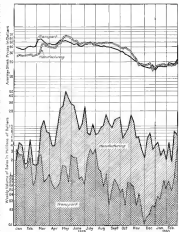
The following table gives the average degree of variance as to feeding activity together with the relative number of shares recorded.

	Share Lost and Dismantled	Per Cent of Total	Average Volume of Yarding	Per Cent of Yarding	Ratio of Average Yarding to Stock
Carroll Wright	6,100,000	41.62	100,000	40.34	61.28
Ashtabula Corp.	5,900,000	39.35	40,000	16.48	61.55
United Ironworks	3,600,000	23.46	10,000	4.07	61.32
Bellevue Ironworks	800,000	5.24	5,000	2.03	61.38
Wichita Ironworks	2,000,000	13.17	3,000	1.21	60.85
Wells & Van Ypersele	4,000,000	26.48	10,000	4.07	62.76
Wells & Van Ypersele	4,000,000	26.48	10,000	4.07	62.76
Wells & Van Ypersele	4,000,000	26.48	10,000	4.07	62.76

^aPercentage of Total Hook Turned Over Weekly

In the construction of the averages, the old Curtiss Aves and Wright Aeronautical have been converted into the equivalent of the present shares. The sum has been done with National Air Transport for the first few weeks of the year prior to the appearance of its new stock. Patterns have been introduced to care for the absence for the earlier weeks of Aviation Corporation, United Air Transport and Detroit Aircraft.

The charts accompanying this article are all user-log



Average prices and sales volume, air and air transport

or "ratio" studies prepared on the same scale. This permits of a true picture of the actual percentage changes in the high and low of each individual stock in exact relation to each of the other issues. By this method all possible distortions is eliminated and it becomes instantly evident when one or another is moving out of line.

In coming for the problem of weighting it can be said, at least for the present, that the selection of this group has automatically eliminated this necessity. All of these issues have shown such high consistency of movement, none displaying more violent counter-movements than any of the others, that a simple arithmetical average gives as adequate an index as it would be possible to derive. After considerable study and experiment with a more elaborate index weighted in accord to the proportionate volume of trading activity the result was practically identical with the index as here given.

In chart 3 the total volume of sales of the eight selected issues is given in connection with the average high and low for each week. At the top of the chart is placed the New York Times index of 25 leading industrial common stocks for purposes of comparison. This index is composed of the following: Am. Petroleum, American Can, Allied Chemical & Dye, American Tel. &

Tel., Atlantic Refining, Burroughs, Case Thawing, De Post de Nemours, Eastman Kodak, General Electric, General Motors, International Business Machine, International Harvester, International Tel. & Tel., R. H. Macy, National Bureau, Texas Gulf Sulphur, Union Carbide & Carbon, United Fruit, U. S. Steel, Westinghouse Electric, and Woolworth.

Thus we have a representative list of seasoned American industrial stocks by which to measure the behavior of aviation stocks. It can truly be said of the above lot—that as they go so goes the nation's prosperity.

On the right side of the chart is a percentage averaging scale which discloses that the above named industrial declined from their September 1926 peak approximately 54%; whereas the aviation stocks show a decline from their May 11th peak, of 79%. Also of interest, the industrial here show an increase from their November low of about 50%; whereas the aviation stocks have come some 33%. In other words, during the level period of the post-flooding weeks these eight aviation issues have shown more rallying power by 8% than have the western and seasoned market leaders. In other words, this extra gain in the air stocks has come in less than the post-flooding weeks.

CANADIAN AVIATION

CANADIAN OPERATIONS are closely linked with those both of the United States and of Great Britain. The current recent expansion is in part the result of that provided in the United States, in part the result of starting light plane clubs on the British model. The expansion in the amount of flying has been even more spectacular than in the United States, except

on the passenger transport side the number of planes having been multiplied by five and a half, the number of pilots by ten, and the hours flown by six and a half in two years.

A large part of the increase is accounted for the past two years is of course due to the limitation of light plane or private flying clubs, the collective record of which is

Commercial Statistics

	1932	1933	1934	1935	1936	1937	1938	1939
Passenger aircraft flown	—	22	15	8	14	26	55	10
Freight aircraft flown	—	5,341	2,576	4,367	4,951	5,863	12,485	15,051
Aviation mileage	—	194,170	43,025	37,120	51,475	50,245	200,051	1,037,013
Aviation mileage	—	15,427	179,919	241,390	226,499	307,481	242,124	151,958
Aviation mileage	—	24,490	21,500	1,000	6,615	5,552	—	22,341
Manpower of commercial aviation	—	—	—	—	—	531	1,092	4,138
Passenger aircraft	—	4,282	2,228	2,584	4,493	5,434	19,702	34,709
Freight aircraft	—	1,211	1,686	1,865	1,676	1,676	14,894	16,751
Aviation mileage	—	16,483	12,646	21,383	124,151	198,369	2,476,752	5,568,000
Total aircraft flown	—	191,811	297,010	268,114	251,495	265,341	121,809	1,526,615
No. of commercial air accidents, air accidents	—	1	1	1	1	2	4	36
No. of accidents per million aviation miles	—	57.3	19.3	9.4	6	12.7	1.9	6.8

Licenses and Certificates

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
General aviation	—	48	41	39	11	15	34	139	—	—
General aviation	—	4	4	1	1	1	13	12	—	—
Aviation flying hours	—	1	1	1	1	1	24	21	31	—
Aviation flying hours	—	1	1	1	1	1	1	1	4	—
Total aircraft flown	—	41	37	37	12	16	48	156	—	—
Aviation flying hours	—	11	11	12	14	28	46	210	341	—
Aviation flying hours	—	49	36	39	39	39	39	39	134	—
Aviation flying hours	—	10	106	109	101	91	34	134	261	—
Aviation flying hours	—	29	19	19	19	19	19	19	—	—

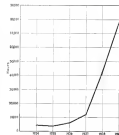
calculated on the page. Of the total amount of flying done in Canada, the clubs contributed approximately 20 per cent both in 1938 and 1939. Their activities in 1939 were almost exactly double those of the previous year in every respect, except that the number of clubs operating was increased by only 50 per cent and the number of planes by 150. The average number of planes per club has increased from 2.5 to 3.4.

The club-borne of course have a predominant factor in the great increase of private flying in 1938 and of both private and commercial planes in 1939, a number of those who learned to fly through the club in the previous year having gone on to take commercial licenses.

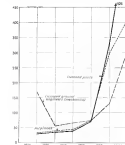
NOTWITHSTANDING Canadian production for 1939 are as yet available, but beyond question the D-11 Mach played the largest part. In 1938 the DeHavilland Company of Canada had approximately two-thirds of the total production of the country. In 1939 it probably exceeded its percentage. At the end of 1938 almost exactly one-third of all airplanes registered were Machs. (On the other hand, at the end of 1938 the total of all American factories made up 68 per cent of the total Canadian

Airports

	1932	1933	1934	1935	1936	1937	1938	1939
Airports (public, state or municipal)	4	5	5	5	5	5	10	10
Airports (private or commercial)	11	12	9	10	10	10	12	8
Airports (municipal or commercial)	1	1	1	1	1	1	1	1
Airports (municipal or commercial)	4	11	9	10	10	11	7	20
Total airports and airports	—	—	—	—	—	—	—	—
Total airports and airports	20	21	24	26	26	26	28	31



Total flying time, commercial and private.



Canadian flying progress.

Government sponsored flying clubs 1932-39

	1937	1939
Number of the	—	11
Members	—	2 400- 5 000
Planes flown	—	6 712- 15 716
Number of planes operated	—	14

registration, the Mach being the only serious competitor of British origin. Eighty planes were exported from the U. S. to Canada in 1939, which was probably not far from the total of all Canadian production.

Canadian airport development has not exactly followed the long established path of the British. Laying aside the airplane stations which are recognized and formally developed in Canada as an matter as yet almost unknown in the United States, the table indicates that the number of commercial airports operated has remained almost constant for seven years, with no real decline during 1939, the year of the great boom in airport construction in the United States. Municipal developments, on the other hand, went forward almost as briskly as in the previous year.

The differences are marked, for the effect of the landing height was not felt in Canada as it was below the international boundary line. The great factor making for increased interest in airports in the last two years has been the increase in flying activity, and especially the formation of the flying clubs, all of which had its own fields to serve as bases, and only a few of which have been in a position to purchase land and develop it at their own expense. Also, there was an such flood of enthusiasm for aeronautical finance in the Dominion in 1939 as marked the financial history of the United States in that year.

Foreign AERONAUTICAL ACTIVITIES

Great Britain

(All figures in thousands of dollars)

	1934-5	1935-6	1936-7	1937-8	1938-9	1939-40	1940-1	1941-2	1942-3
Technical and Scientific Work	11,000	24,000	20,000	30,000	20,000	20,000	20,000	20,000	20,000
Research and development	11,000	24,000	20,000	30,000	20,000	20,000	20,000	20,000	20,000
Construction and maintenance	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Operating expenses, equipment	44	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation (1942-3)	14,100	27,000	22,000	32,000	22,000	22,000	22,000	22,000	22,000
Pay of the Air Force	10,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000
Wages, salaries and costs (Military)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Air Services (Administrative etc.)	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation	13,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation	14,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000	17,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation	15,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation	16,000	19,000	19,000	19,000	19,000	19,000	19,000	19,000	19,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation	17,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000

Minority figures for other expenditures in thousands of dollars.

Excluded from

France

(All figures in thousands of dollars)

	1935	1936	1937	1938	1939	1940
Pay	2,500	2,500	2,500	2,500	2,500	2,500
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	11,000	11,000	11,000	11,000	11,000	11,000

	1939	1940	1941	1942	1943	1944
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	5,000	5,000	5,000	5,000	5,000	5,000

	1939	1940	1941	1942	1943	1944
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	5,000	5,000	5,000	5,000	5,000	5,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	6,000	6,000	6,000	6,000	6,000	6,000

*Excludes in thousands of dollars.

Italy

(All figures in thousands of dollars)

	1935	1936	1937	1938	1939	1940
Pay	2,500	2,500	2,500	2,500	2,500	2,500
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	11,000	11,000	11,000	11,000	11,000	11,000

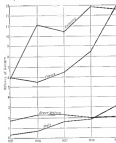
	1939	1940	1941	1942	1943	1944
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	5,000	5,000	5,000	5,000	5,000	5,000

The Netherlands

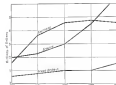
(All figures in thousands of dollars)

	1935	1936	1937	1938	1939	1940
Pay	2,500	2,500	2,500	2,500	2,500	2,500
New Plans & Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Research and Development	1,000	1,000	1,000	1,000	1,000	1,000
Construction and Maintenance	1,000	1,000	1,000	1,000	1,000	1,000
Operating Expenses	1,000	1,000	1,000	1,000	1,000	1,000
Costs not	1,000	1,000	1,000	1,000	1,000	1,000
Total Appropriation*	11,000	11,000	11,000	11,000	11,000	11,000

*Excludes in thousands of dollars.



Total appropriations for civil aviation.



Direct subsidies to air transport.

DATA on the development of military aviation are hard to secure. No European or Asian country is so frank with information as Germany, and, personally so far as our own War and Navy Departments. The figures presented above and the budgets on the opposite page are the best index of military activity that can be offered.

In presenting the budgetary figures, conversion into dollars has in all cases been made at present exchange rates. Most of the tables are not extended back far enough to strike the vein of valuer exchange fluctuations, when intelligible conversion from one currency into another was almost impossible.

Comparison between countries must of course, be made with good care, both because of the varying price levels and because of the varying scope of "military aid"

Military Aviation

Country	Offices	Men	Planes in Air Force	Planes in Air Force	Planes in Air Force	Planes in Air Force	Planes in Air Force	Planes in Air Force	Planes in Air Force
Argentina	—	—	—	—	—	—	—	—	—
Australia	1,240	200	—	—	—	—	—	—	—
Belgium	—	—	—	—	—	—	—	—	—
Canada	—	—	—	—	—	—	—	—	—
France	—	—	—	—	—	—	—	—	—
Germany	—	—	—	—	—	—	—	—	—
India	—	—	—	—	—	—	—	—	—
Italy	—	—	—	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—
South Africa	—	—	—	—	—	—	—	—	—
United States	—	—	—	—	—	—	—	—	—
Great Britain	—	—	—	—	—	—	—	—	—
Canada	—	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	—	—	—	—
New Zealand	—	—	—	—	—	—	—	—	—
South Africa	—	—	—	—	—	—	—	—	—
India	—	—	—	—	—	—	—	—	—
Ceylon	—	—	—	—	—	—	—	—	—
Burma	—	—	—	—	—	—	—	—	—
Philippines	—	—	—	—	—	—	—	—	—
Thailand	—	—	—	—	—	—	—	—	—
Indochina	—	—	—	—	—	—	—	—	—
Malaya	—	—	—	—	—	—	—	—	—
Indonesia	—	—	—	—	—	—	—	—	—
Other	—	—	—	—	—	—	—	—	—

*Approximate figures derived from number of aircraft units.
Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.
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Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

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Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

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Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

*Approximate figures derived from number of aircraft units.
Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

*Approximate figures derived from number of aircraft units.
Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

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Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

*Approximate figures derived from number of aircraft units.
Figures are for the latest year available, in most cases 1939 or 1940-41. Most of the figures are derived from the League of Nations Yearbook for 1940-41.

Annual Airplane Mileage in Air Transport

	1931	1932	1933	1934	1935	1936	1937	1938	1939
Australia	—	—	—	—	20	40	—	—	—
Belgium	—	—	—	—	—	—	20	—	—
Canada	—	14	136	394	143	143	307	329	333
Central America	—	—	—	—	111	111	102	500	227
Denmark	—	—	—	—	—	127	117	92	96
Egypt	—	—	—	—	—	—	307	323	—
France	500	1,460	1,734	2,124	2,264	2,076	3,711	4,743	—
Germany	370	1,124	240	440	154	1,024	1,014	4,143	1,139
Greece Britain	494	195	111	305	136	117	819	474	1,109
Italy	—	—	—	—	—	—	123	917	1,174
The Netherlands	11	217	240	131	400	374	131	1,100	1,750
Poland	—	—	—	—	—	—	—	474	—
Russia	—	—	81	154	312	374	81	1,107	1,144
Sweden	—	—	—	—	130	24	21	204	204
Switzerland	—	—	—	—	117	97	195	194	—
United States	—	—	—	—	—	—	4,711	5,414	36,477
									10,719

Passenger Traffic in Passenger-Miles

	1931	1932	1933	1934	1935	1936	1937	1938	1939
France	182	3,352	3,375	2,449	2,136	2,603	4,830	4,719	4,708
Germany	189	1,128	1,305	1,181	1,110	4,410	9,118	10,124	11,078
Greece Britain	1,841	1,704	2,526	3,140	3,140	3,140	4,724	5,247	—
Italy	—	—	—	—	—	—	—	1,103	1,103
The Netherlands	70	181	271	100	302	1,100	1,100	3,100	4,353
Russia	—	—	—	—	—	—	—	1,100	1,100
United States	—	—	—	—	—	—	—	—	—

Express and Mail Traffic in Ton-Miles

	1931	1932	1933	1934	1935	1936	1937	1938	1939
France	14,700	14,700	172,100	244,700	157,700	147,700	147,700	157,700	157,700
Germany	17,000	17,000	11,400	2,020	20,000	20,000	20,000	20,000	20,000
Greece Britain	30,000	4,400	42,000	44,000	104,000	104,000	110,000	104,000	104,000
Italy	—	—	—	—	—	—	—	—	—
The Netherlands	5,000	10,000	21,000	10,000	20,000	10,000	10,000	10,000	10,000
Russia	—	—	—	—	—	—	—	—	—
United States	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000

Year 1 January of year only

Per Cent of Regularity

	1931	1932	1933	1934	1935	1936	1937	1938	1939
France	27.4	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2
Germany	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
Italy	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
The Netherlands	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
Russia	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
United States	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1

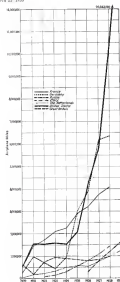
It will be observed that the above figures are determined on varying bases. The American reliability figures given for the six mail services are calculated on percentage of scheduled mileage flown, which represents approximately 11 to 12 percent of total flight. Figures in the British table and in those given for Germany and the Netherlands.

which no return has as yet come in, that the aggregate transport mileage flown under American control in 1939 was almost exactly the total for all of Europe. The same relation holds for passenger traffic. For mail and express traffic combined, however, the United States appears to have a distinct lead, of the order of six per cent, on the entire European continent.

Although, as was indicated on page 601, budgetary figures must be compared with caution, there is a certain interest in the calculation of the total civil aviation mileage per mile flown by transport planes. For Great Britain it is approximately \$2.06, for France the same, for Germany about \$1.85 average over the last three years, for Italy \$1.75, and for the United States, coming in the

Post-office Department's estimated operating loss on the air mail service, about 70 cents.

The differences in regularity of service among the various countries are less than might be expected, considering the widely different types of organizations and the varying inherent difficulties of the routes flown. Taking the percentage of scheduled trips completed as a measure of reliability, since that is the ratio available for the largest number of countries, the average for the last four years is found to be 94.5 per cent, for The Netherlands, 92.3 for the United States (figured on a slightly different basis which might raise the average about 0.5 per cent as compared with the European ones), the next for Great Britain, and 91.0 for Germany.

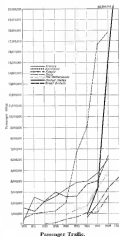


Total Air Transport Mileage Annually.

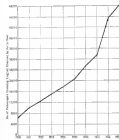
Commercial Efficiency
(Per Cent of Total Capacity of 42 Scheduled Flights Operated by Passenger)

	1937	1938	1939
France	—	—	—
Italy	42.1	42.1	42.1
The Netherlands	42.1	42.1	42.1
Germany	—	—	—

At 42.1—Passenger Miles per 100,000. Based on 1938. For the first two months of 1939 the total was 4,000, an average of 42.1 to 42.1 and 42.1 to 42.1.



Passenger Traffic.



Specifications of American Commercial Airplanes

Included only places with Approved Type Exemptions—ATTENTION Item not assume responsibility for the figure given

[illegible][illegible]

Specifications of American Commercial Airplanes

¹ Including only plants with Approved Type Licenses—BIOACTION does not assume responsibility for the accuracy of data.

Manufacturer	Designation	GENERAL						POWER PLANT							
		ASAC No.	Price of Frames	Open	Size of Bays	Length Overall	Height Overall	Motor Supplier	Turn Ratio Req.	Age of Motor	Panel Cost	Cost of Motor	Normal Range	Life Expectancy of Motor	Notes of Prop.
East Atlantic Co.	Model 1	121	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	122	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	123	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	124	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	125	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	126	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	127	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	128	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	129	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	130	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	131	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	132	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	133	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	134	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	135	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	136	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	137	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	138	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	139	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	140	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	141	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	142	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	143	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	144	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	145	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	146	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	147	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	148	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	149	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	150	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	151	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	152	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	153	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	154	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	155	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	156	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	157	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	158	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	159	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	160	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	161	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	162	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	163	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	164	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	165	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	166	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	167	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	168	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	169	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	170	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	171	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	172	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	173	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	174	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	175	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	176	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	177	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	178	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	179	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	180	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	181	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	182	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	183	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	184	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	185	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	186	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	187	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	188	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	189	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	190	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	191	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	192	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	193	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	194	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	195	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	196	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	197	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	198	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	199	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	200	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	201	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	202	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	203	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	204	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	205	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	206	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	207	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	208	\$600.00	12	12	12	12	West	1:1	1950	\$100.00	\$100.00	100-150	10-15	
East Atlantic Co.	Model 1	209	\$600.00	12	12	12	12	West	1:1	19					

[illegible]

Specifications of American Commercial Airplanes

Including only planes with Adjusted Error Coefficients—EFFECT does not assume responsibility for the figures given

[illegible]

A	Apple	14	Apple	21	Apple	28	Apple	35	Apple	42	Apple	49	Apple	56	Apple	63	Apple	70	Apple	77	Apple	84	Apple	91	Apple	98	Apple	105	Apple	112	Apple	119	Apple	126	Apple	133	Apple	140	Apple	147	Apple	154	Apple	161	Apple	168	Apple	175	Apple	182	Apple	189	Apple	196	Apple	203	Apple	210	Apple	217	Apple	224	Apple	231	Apple	238	Apple	245	Apple	252	Apple	259	Apple	266	Apple	273	Apple	280	Apple	287	Apple	294	Apple	301	Apple	308	Apple	315	Apple	322	Apple	329	Apple	336	Apple	343	Apple	350	Apple	357	Apple	364	Apple	371	Apple	378	Apple	385	Apple	392	Apple	399	Apple	406	Apple	413	Apple	420	Apple	427	Apple	434	Apple	441	Apple	448	Apple	455	Apple	462	Apple	469	Apple	476	Apple	483	Apple	490	Apple	497	Apple	504	Apple	511	Apple	518	Apple	525	Apple	532	Apple	539	Apple	546	Apple	553	Apple	560	Apple	567	Apple	574	Apple	581	Apple	588	Apple	595	Apple	602	Apple	609	Apple	616	Apple	623	Apple	630	Apple	637	Apple	644	Apple	651	Apple	658	Apple	665	Apple	672	Apple	679	Apple	686	Apple	693	Apple	700	Apple	707	Apple	714	Apple	721	Apple	728	Apple	735	Apple	742	Apple	749	Apple	756	Apple	763	Apple	770	Apple	777	Apple	784	Apple	791	Apple	798	Apple	805	Apple	812	Apple	819	Apple	826	Apple	833	Apple	840	Apple	847	Apple	854	Apple	861	Apple	868	Apple	875	Apple	882	Apple	889	Apple	896	Apple	903	Apple	910	Apple	917	Apple	924	Apple	931	Apple	938	Apple	945	Apple	952	Apple	959	Apple	966	Apple	973	Apple	980	Apple	987	Apple	994	Apple	1001	Apple	1008	Apple	1015	Apple	1022	Apple	1029	Apple	1036	Apple	1043	Apple	1050	Apple	1057	Apple	1064	Apple	1071	Apple	1078	Apple	1085	Apple	1092	Apple	1099	Apple	1106	Apple	1113	Apple	1120	Apple	1127	Apple	1134	Apple	1141	Apple	1148	Apple	1155	Apple	1162	Apple	1169	Apple	1176	Apple	1183	Apple	1190	Apple	1197	Apple	1204	Apple	1211	Apple	1218	Apple	1225	Apple	1232	Apple	1239	Apple	1246	Apple	1253	Apple	1260	Apple	1267	Apple	1274	Apple	1281	Apple	1288	Apple	1295	Apple	1302	Apple	1309	Apple	1316	Apple	1323	Apple	1330	Apple	1337	Apple	1344	Apple	1351	Apple	1358	Apple	1365	Apple	1372	Apple	1379	Apple	1386	Apple	1393	Apple	1400	Apple	1407	Apple	1414	Apple	1421	Apple	1428	Apple	1435	Apple	1442	Apple	1449	Apple	1456	Apple	1463	Apple	1470	Apple	1477	Apple	1484	Apple	1491	Apple	1498	Apple	1505	Apple	1512	Apple	1519	Apple	1526	Apple	1533	Apple	1540	Apple	1547	Apple	1554	Apple	1561	Apple	1568	Apple	1575	Apple	1582	Apple	1589	Apple	1596	Apple	1603	Apple	1610	Apple	1617	Apple	1624	Apple	1631	Apple	1638	Apple	1645	Apple	1652	Apple	1659	Apple	1666	Apple	1673	Apple	1680	Apple	1687	Apple	1694	Apple	1701	Apple	1708	Apple	1715	Apple	1722	Apple	1729	Apple	1736	Apple	1743	Apple	1750	Apple	1757	Apple	1764	Apple	1771	Apple	1778	Apple	1785	Apple	1792	Apple	1799	Apple	1806	Apple	1813	Apple	1820	Apple	1827	Apple	1834	Apple	1841	Apple	1848	Apple	1855	Apple	1862	Apple	1869	Apple	1876	Apple	1883	Apple	1890	Apple	1897	Apple	1904	Apple	1911	Apple	1918	Apple	1925	Apple	1932	Apple	1939	Apple	1946	Apple	1953	Apple	1960	Apple	1967	Apple	1974	Apple	1981	Apple	1988	Apple	1995	Apple	2002	Apple	2009	Apple	2016	Apple	2023	Apple	2030	Apple	2037	Apple	2044	Apple	2051	Apple	2058	Apple	2065	Apple	2072	Apple	2079	Apple	2086	Apple	2093	Apple	2100	Apple	2107	Apple	2114	Apple	2121	Apple	2128	Apple	2135	Apple	2142	Apple	2149	Apple	2156	Apple	2163	Apple	2170	Apple	2177	Apple	2184	Apple	2191	Apple	2198	Apple	2205	Apple	2212	Apple	2219	Apple	2226	Apple	2233	Apple	2240	Apple	2247	Apple	2254	Apple	2261	Apple	2268	Apple	2275	Apple	2282	Apple	2289	Apple	2296	Apple	2303	Apple	2310	Apple	2317	Apple	2324	Apple	2331	Apple	2338	Apple	2345	Apple	2352	Apple	2359	Apple	2366	Apple	2373	Apple	2380	Apple	2387	Apple	2394	Apple	2401	Apple	2408	Apple	2415	Apple	2422	Apple	2429	Apple	2436	Apple	2443	Apple	2450	Apple	2457	Apple	2464	Apple	2471	Apple	2478	Apple	2485	Apple	2492	Apple	2499	Apple	2506	Apple	2513	Apple	2520	Apple	2527	Apple	2534	Apple	2541	Apple	2548	Apple	2555	Apple	2562	Apple	2569	Apple	2576	Apple	2583	Apple	2590	Apple	2597	Apple	2604	Apple	2611	Apple	2618	Apple	2625	Apple	2632	Apple	2639	Apple	2646	Apple	2653	Apple	2660	Apple	2667	Apple	2674	Apple	2681	Apple	2688	Apple	2695	Apple	2702	Apple	2709	Apple	2716	Apple	2723	Apple	2730	Apple	2737	Apple	2744	Apple	2751	Apple	2758	Apple	2765	Apple	2772	Apple	2779	Apple	2786	Apple	2793	Apple	2800	Apple	2807	Apple	2814	Apple	2821	Apple	2828	Apple	2835	Apple	2842	Apple	2849	Apple	2856	Apple	2863	Apple	2870	Apple	2877	Apple	2884	Apple	2891	Apple	2898	Apple	2905	Apple	2912	Apple	2919	Apple	2926	Apple	2933	Apple	2940	Apple	2947	Apple	2954	Apple	2961	Apple	2968	Apple	2975	Apple	2982	Apple	2989	Apple	2996	Apple	3003	Apple	3010	Apple	3017	Apple	3024	Apple	3031	Apple	3038	Apple	3045	Apple	3052	Apple	3059	Apple	3066	Apple	3073	Apple	3080	Apple	3087	Apple	3094	Apple	3101	Apple	3108	Apple	3115	Apple	3122	Apple	3129	Apple	3136	Apple	3143	Apple	3150	Apple	3157	Apple	3164	Apple	3171	Apple	3178	Apple	3185	Apple	3192	Apple	3199	Apple	3206	Apple	3213	Apple	3220	Apple	3227	Apple	3234	Apple	3241	Apple	3248	Apple	3255	Apple	3262	Apple	3269	Apple	3276	Apple	3283	Appl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Specifications of American Commercial Airplanes

Including only places with reported Type C outbreaks—**EXTENSION** does not assume universality for the specific place

[illegible]

Artist	Album	Label	Release Date	Genre	Rating	Notes
Al Green	Challenge	Atlantic	1971	Soul	4.5	Classic soul album
Al Green	Let's Get It On	Atlantic	1973	Soul	4.5	Classic soul album
Al Green	One of Those Things	Atlantic	1974	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1975	Soul	4.5	Classic soul album
Al Green	Love and Happiness	Atlantic	1976	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1977	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1978	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1979	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1980	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1981	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1982	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1983	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1984	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1985	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1986	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1987	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1988	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1989	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1990	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1991	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1992	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1993	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1994	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1995	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1996	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1997	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1998	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	1999	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2000	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2001	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2002	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2003	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2004	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2005	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2006	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2007	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2008	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2009	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2010	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2011	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2012	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2013	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2014	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2015	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2016	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2017	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2018	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2019	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2020	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2021	Soul	4.5	Classic soul album
Al Green	Call Me	Atlantic	2022	Soul	4.5	Classic soul album

Specifications of American Commercial Airplanes

Publication only states with Annotated Type Contribution. **AFNATION** does not assume responsibility for the views given.

[illegible][illegible]

Specifications of American Commercial Airplanes

Installing only places with Approved Type Certificates—BELLFLOW does not assume responsibility for the systems given

[illegible][illegible]

French Firms Build Seven New Designs

PARIS (REUTERS)—Among a number of new French planes under construction or recently completed, the Alloué A-20 light mid plane and the Marmon flying boat have shown particularly interesting performance. The A-20 is a mid-engine monoplane with two 70-hp by engines (Salmson, Anzani, Walcar, Gnome) carried in wing nacelles. It will fly on either engine, and its empty load is said to be 528 lb. with gross weight of 1,273 lb. loaded. The Marmon, now being built by Hebeur, Hebeur, Besson, and taken over by Althaus of the Marmon when that other firm went out of business. It is capable of carrying six passengers and a crew of three, with three 420 hp. Gnome-Rhone-Jupiter engines mounted over the wings. Its empty load is 12,130 lb. with gross weight of 13,150 lb., and it has been taken off the water with no engine stoppage, carrying 5,220 lb. of load.

Other new French planes nearing completion include a Dornier D-15 light commercial monoplane for four passengers and pilot, with 770 hp. Hispano-Wright engine, a 700-mph. mid-plane seaplane with streamlined wings, a four-engine commercial seaplane, an all-metal Caudron monoplane to carry three 220 hp. Salmson engines, and the Caudron C-150, a mid-engine biplane with folding wings, intended for production at an attractive price.

Develop Persian Airways

TEHRAN (Reuters)—Companies representing five different airlines are now operating services to or across this country according to a report by the U. S. Department of Commerce representative. Most of the major airlines are operated by the Iranian company which owns the airports here. Imperial Airways makes stops at Bushahr and Kutch, and K.L.M. planes fly from Amsterdam to Basrah, Iraq, follow the coast along the Persian gulf. A French company has also requested permission to set it for a line to Saigon, Indochina. A Russian company has a terminal at Fahlavi in the north. Altogether there are 25 landing fields in Persia.

Luh Hanes Gets Chinese Rights

BERLIN (Reuters)—Deutsche Luft Hansa announced that no representative have agreed an agreement with the Chinese Minister of Communications under which it is given the right to carry air and from Germany to China by the southern route. It is understood that the firm will enter into negotiations with the Chinese government for the right to serve Russia via Ulaanbaatar, probably in co-operation with the Russian airline which has already been established between Moscow and Ulaanbaatar.

Plan Around-Baby Tour

RODIE (Reuters)—Following the decision that Italian planes will refrain from cooperation in this year's European Light Plane Tour, an around-Baby tour has been organized. The event will be held in August and the itinerary will include London, Angers, Caen, Brindisi, Venice, Palermo, Paris, Florence, Pisa, and Genoa.

Foreign Briefs

Four-day passenger service from New York to Paris, using planes between Queenstown, Ireland and Lough Erne, will be tried this spring. Lufthansa Air Force will start five round-trip flights between Europe and its airfield near Rome. Evropa has also ordered twelve of these machines for the Air Force.

Leaves of absence Polish military aviators have been saved by Irish Air Corps during the past two weeks, and according to the Warsaw Royal Air Force also several groups from a landing plane with an Irish plane.

Air Vice-Marshal Sir Robert Brooke-Pollock, now in command of the Royal Air Force in Iraq, has been appointed Commissioner of the Imperial German Colonies, according to Vay Gek II Berlin.

A Caudron Generali Aeroplane plane recently arranged 105.5 mph for the 1000 m between Marnes-la-Meudon and Orléans, including all stops.

Lothar Bregant has been made chairman of the Comité Français de la Navigation Aérienne, succeeding the late Lucien Besson.

Southern Railway, one of the largest British railroads, has acquired a substantial interest in Imperial Airways and plans to cooperate new services in cooperation with the latter company.

Marcel Belletta will accompany Capt. Escadron Caudron in his attempt to fly from Paris to New York this summer. He is now taking flight training to qualify for a pilot license.

The Lufthansa factory at Menden, Prussia, was destroyed by fire recently, together with many valuable designs.

Mexican Aviation Co. expects to incorporate a direct weekly passenger and express service between Vera Cruz and Villahermosa immediately.

Federal Aviation board before the Royal Aeronautical Society March 14 on Air and Effects of the Association of Germanic Airplane Manufacturers on Air Transport March 16 before the Royal Aeronautical Society and the Institute of Transport.

Mexican military aviators will make a survey of the dry lake at Lake Texcoco, due from which is often blown from the city causing much inconvenience and damage.

The R. 38 aeromodel prize given by the Royal Aeronautical Society was awarded to José Hilda M. Leon, M. A.

A.F.R. As 5, for 1939, for low paper on The Strength of Timken Roller Bearings

Plans are being made in France to transform the wartime design of the Gervaise to a commercial design, at a cost of about \$10,000. A new airport is to be constructed at Chateau-Boulogne, on the proposed Cherbourg-Bonifacio-Spazio route.

State government of Pernambuco, Brazil, will meet a meeting next at Jacaria Field near Recife, preliminary to the visit of the Graf Zeppelin this spring.

Partial participation figures recently released credit the British Hawker Hurricane with 5,000 to 6,000 ft. in 3 sec., and speed of 170 mph at sea level. Its ratio of gross weight to net weight is 1.6.

Imperial Airways has been granted a three months' provisional extension for negotiating the India air mail across Greece, pending a definite agreement. The service will soon operate regularly by way of Beirut and Athens.

In connection with the Alitalia-Gesellschaft agreement to expand the new Athens-Rome air service, the latter will be equipped with 5.50 five-engine planes.

Transamerica Co. has adopted the well-known Atlas 300 series engines on their fasteners planes.

Wolf Hirth has been awarded the German national trophy for the most outstanding sporting flight of 1938 for his crossing of the Alps in a 40 hp. Rheinstar last October.

Following this crossing he flew to Milan, Rome and Brindisi, in Italy, and then to Marseilles, France, returning to Germany, he crossed the Alps the second time.

An eight-place tandem service, available in the future at the rate of about \$1.75 per mile, has been planned in operation in the Balkans by the French military authorities, it has been announced.

Mexico Licenses Civil Pilots

MEXICO CITY (Reuters)—Three classes of civilian pilots have been authorized by the Mexican government, issued by the department of aviation of the Ministry of Communications and Public Works. All three classes must pass tests in their various specialties, now entered by the department.

The first class is transport pilot and the holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The second class is for private pilot. The third class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The third class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The fourth class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The fifth class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The sixth class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.

The seventh class is for private pilot. The holder of such a license will be considered to operate a plane of any kind that carries passengers on any route in Mexico and the Americas.



Zooming upwards the ground is forgotten; but when you nose your ship down for the landing, a feeling of greater confidence will come with the reflection that the landing gear is Timken-Bearing-Equipped.

For you will know that beneath you are wheels of utmost strength; wheels that impacts cannot harm; wheels without side-shake or wobble; wheels that curb

ground loop; wheels that make braking smooth and uniform; wheels that will set you down safely on any terrain.

Timken-equipped landing and tail wheels are wisdom's choice for planes of all types and all sizes... through the exclusive combination of Timken tapered construction; Timken POSITIVELY ALIGNED ROLLS and Timken-made steel.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN Tapered Roller BEARINGS

The Resources of a GREAT INDUSTRY

TODAY, the electrical industry is one of the greatest allies of aeronautics. Every gadgetry in the development of air transport must utilize electricity as an important factor not only in its thousands of applications on the ground but also in the air.

The aeronautics industry is now depending upon electricity for radio, instruments for navigation and flight, gunnery systems, lighting units, and manufacturing and service equipment. General Electric has developed many of these devices to a degree of remarkable dependability. We serve your interests in these products. Write us.

POINT SKYWARD



The Advanced Works of the General Electric Company is one of several G.E. manufacturing units in the United States devoted to the manufacture of electric products.



The engine engine is represented by a General Electric engine for use in aircraft and ships.

Engine components, pistons, valves and valve seating, General Electric products.

Engine components include pistons, valves and valve seating, General Electric products.

Engine components include pistons, valves and valve seating, General Electric products.

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

THE CONTROL PULLEY AVIATION HAS BEEN WAITING FOR

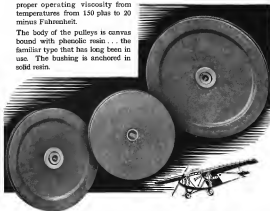
FORMICA is offering a line of ball bearing control pulleys which greatly reduce the friction and make planes much easier to control.

This pulley is equipped with a special Fafnir ballbearing and is lubricated with an oil that will retain a proper operating viscosity from temperatures from 150 plus to 20 minus Fahrenheit.

The body of the pulleys is canvas bound with phenolic resin . . . the familiar type that has long been in use. The bushing is anchored in solid resin.

Where it is desired to avoid lubrication, a line of pulleys with bronze bushings is available of Formica manufacture.

Write for literature and prices



THE FORMICA INSULATION COMPANY
4522 Spring Grove Avenue Cincinnati, Ohio

FORMICA

Travelling in MINUTES where HOURS were once required

How a Sikorsky Amphibian helps Bro. G. Dahlberg to be in Chicago, New York and Florida in one week



How the Florida country looks from the comfortable cabin of a Sikorsky Amphibian

TIME and distance are two factors that demand the attention of those concerned in modern industry. The Colgate Company, for example, has no general offices in Chicago and no factory across the river from New Orleans. In Florida are the plantations and mills of the Southern Sugar Company, and the Stock Coast Company's properties are located in various parts of Louisiana.

The operation of these companies frequently requires Mr. Bro. G. Dahlberg, their founder and executive head, to be in the North, East and South all in the same week. He travels almost exclusively by air, using the comfort, speed and dependability of his Sikorsky Amphibian to save him many unprofitable hours each week.

With a full load cruising speed of 110 miles an hour, the "Big" Amphibian can ordinarily travel from New York

to Chicago in less than a day. The ship is so stable and comfortable it gives one the sense of complete relaxation usually associated with a deep leather chair at the club. Two Pratt & Whitney "Wasp" engines of 425 H. P. each provide a wealth of reserve power. The ship can fly and maneuver on either engine.

Every leg, lark and lake is a landing field for the "Big," and it only requires a touch of a control to drop the wheels and convert her to a seaplane.

Many executives in business and industry whose wide interests force them to spend many hours a week in travel have found the way to effect a 75% saving in time . . . and double their travel pleasure . . . by using the famous Sikorsky Amphibian. An unusually attractive bidder has just been issued, describing this ship. May we send you a copy? Sikorsky Aircraft Corporation, Bridgeport, Connecticut. Division of United Aircraft & Transport Corporation.

This is passenger Sikorsky Amphibian used by Mr. Dahlberg in flying to reach and beyond great business interests, as proved with one 425 H. P. Pratt & Whitney "Wasp" engine, and easily and maneuver on either engine.



SIKORSKY AMPHIBION

The New LOCKHEED SIRIUS



Low-Wing Mail Ship

Introduced for the first time to the aircraft buying public at the International Aircraft Show, the Lockheed Sirius has been accorded enthusiastic reception. Orders totaling \$100,000 were received for this new ship within two weeks after its A.T.C.—No. 300—was issued. Originally designed for Col. Landburgh, the Lockheed Sirius is now a standard model in the famous Lockheed line. It offers passenger, mail, and express line operators a low wing commercial plane that is easy to fly and which has a quick take-off

and a surprisingly slow landing speed.

Having the same size fuselage as the Lockheed Vega, the Sirius can be fitted with a four or six place cabin, entered by a door over the wing. For use as a mail or express plane it can be equipped with a large capacity baggage compartment. Other convertible features are available on special order.

The Lockheed Sirius is priced at \$18,985.

Complete specifications, weights, and performance data will be supplied upon request.

Cruising Speed	140 m. p. h.
Landing Speed	45 m. p. h.
Climb	1000 ft. per min.
Pay Load	1450 pounds

**DETROIT
AIRCRAFT**

UNION TRUST BUILDING, DETROIT

CHAMBERLAIN BLDG., NEW YORK 22 BOGGS BLDG., LOS ANGELES

LOCKHEED AIRCRAFT CORPORATION
BRYAN AIRCRAFT CORPORATION
PARSONS AIRCRAFT CORPORATION
PACIFIC AIRCRAFT CORPORATION
SOUTHERN AIRCRAFT CORPORATION
WESTERN AIRCRAFT CORPORATION

Grosse Ile Airport—Open to Visiting Pilots—Bus Service to Detroit

You can't expect an aircraft engine to perform on a magazine page but PERFORMANCE in the air is **PROOF**

Compare to the record of

WESTERN UNION

ENGINEERING, MANUFACTURING, AND SERVICE FOR THE AIRCRAFT INDUSTRY

1933

Delivered, New York City, N.Y.

and Delivered to U.S. Navy, N.Y.C.

Light Manufacturing & Repair Co.,
(Incorporated in Pennsylvania)
State Street,
Philadelphia, Pennsylvania

Reference our delivery to you of our first Western Union engine with 1000 horsepower engine as shown that your engine should be in operation in very few days. Our pilots advise the engine starts and runs satisfactorily, and we are confident that you will be able to operate it in the air.

PLANT 3000 FT. T.M.



sent by West Aircraft, Inc., after their installation and test of the TIGER—Brownback C400

Because of its compact design and sturdy construction the TIGER Aircraft Engine provides 1000 horsepower at an extremely low price—less than a weight of less than 1000 pounds. Its compact design is especially simple design reduces the cost of volume and service. A particularly successful engine for training planes.

We will be glad to arrange a demonstration of the TIGER IN THE AIR, or we will send descriptive literature including complete specifications on request. Aeronautical Division, LIGHT MANUFACTURING & FOUNDRY CO., DETROIT, MI.

SMOOTH, VIBRATIONLESS POWER

Brownback
C400

TIGER

DEPARTMENT OF COMMERCE APPROVED TYPE CERTIFICATE No. 33

Improved Wearing Qualities

CHENEY-CAST CYLINDERS for BROWNBACK

In the long and thorough research work preceding the development of the remarkable nickel-iron used in Cheney-Cast Cylinders, the prime importance of wear-resisting characteristics was continually emphasized.

The resulting iron, with a uniform distribution of carbon, has exceptional wearing qualities as well as high strength characteristics.

If you have been thinking of cast cylinders in terms of ordinary gray iron castings, it will pay you to investigate Cheney-Cast Cylinders. They are the result of twenty-five years' experience in making air-cooled cylinders.

S. Cheney and Son
MANHATTAN, N.Y.



Brownback Model C-400
Motor Equipped with
Cheney-Cast Cylinders



Haskelite helps provide long life in the "Vindicator," first commercial transport of the General Aircraft Corp.



LONG LIFE—

It is no longer unusual to produce planes that fly. Even special speed or other striking characteristics are discounted by operators unless the plane is able to stand up for long periods in use—and some times abuse.

The selection of Haskelite for all plywood applications is an example of designing for long life. The advantages of this blood albumin glued plywood are particularly important when used as in the "Fleetster" for wing covering.

HASKELITE
MANUFACTURING CORPORATION
120 South La Salle St., Chicago, Ill.



General Flying Service
Air America, Inc.
Spokane Falls, Wash.
Garrett Corp. U.S.
California Pacific Air Lines Co.
San Francisco, Calif.
De Cadeville, Haskelite & Son
Indianapolis, Indiana U.S.A.

GLASS that ADDS to SAFETY

MAKERS of many commercial planes today are adding to the safety of their passengers by use of the new laminated glass—Duo-lite. For this first, clear-vision glass is proof against shattering in event of forced landings on rough fields.

Duo-lite consists of two sheets of fast-drawn window glass laminated by the new Grainger process. It is only 1/4 inch of an inch thick and it weighs but forty-five

ounces per square foot.

We will be glad to send you full information about Duo-lite and our other types of non-shatter glass, including special test glass for cockpit windshields. These may be ordered through any of the Warhouses of the Pittsburgh Plate Glass Company, located conveniently in all leading cities.

DUPLATE CORPORATION
GRANT BUILDING
PITTSBURGH, PA.



This powerful DuPont engine, 100 h.p., and its mod glass is equipped with Duo-lite non-shatter glass.

Duo-lite

NON-SHATTER GLASS FOR AVIATION USE

Thinnest laminated glass made. 1/8 to 5/32 in. thick. Weight 24 to 36 oz. per square foot.



Thinnest quality of fine plate laminated in 1/4 in. thickness. Weight 48 oz. per square foot.

Thompson Valves from Famous Cylinders

(This advertisement is one of a series showing Thompson Valves from some of the latest aero motors that need them in setting new world's endurance records)

...from the
Wright E-2

300-hour Motor-1921



The famous Wright E-2 motor that established a world wide endurance record in 1921, mounted on government testing stand.

A WORTHY forerunner of modern world's record endurance flights was the venerable 190 H. P. Wright E-2 motor which survived the historic 300-hour full throttle block test by the United States Government at Anacostia, D. C., in the spring of 1921.

Two of the Thompson Valves which contributed to the remarkable ruggedness of this pioneer motor are shown on this page, exactly as removed at the end of 300 hours.

The performance of Thompson Valves at Anacostia was among the first of many endurance records that have influenced aeronautical engineers to install Thompson Valves in 55% of all American-built aero motors today.



A photograph of two Thompson Valves after running 300 hours on the Anacostia test of 1921.

THOMPSON PRODUCTS, INCORPORATED
General Office: CLEVELAND, OHIO, U. S. A.
Factories: CLEVELAND and BOSTON



Thompson Valves

WHERE UDYLITE BEAUTIFIES AND PROTECTS



Udylite Safeguards the World's Finest Speed-Boats

From the straining bow forward to the foamy wake streaming out aft, the speedboat is a delicate, quivering thing. This structure of mahogany and brass is built around a powerful, carefully tuned motor with all its vital parts and exposed metal fittings protected by the Udylite Process. Here as elsewhere fine parts deserve the finest protection—Udylite.

Udylite

ADDING A PERMANENCE TO THE PRODUCT

All fine metal gets off to a fair start in its race against rust and corrosion over the stretches of land and sea. But soon after the installation, some glossy parts begin to limp along behind. Everyday varying weather conditions and better exposure gnaw away and undermine more and more of the iron and steel that is not fully protected and insured against the ravages of years.

It is to avoid this danger that Udylit metal guards speedboats and battleships, fine radio parts, automobiles, and delicate airplane parts.

The Udylite Process makes a hard race also a long one when it adds permanent protection and beauty to exposed metal.

The UDYLITE PROCESS COMPANY

Eastern Office
30 East 42nd St., New York

3220 Bellevue Avenue
DETROIT MICH.

Western Sales Office
214 Sunset St., San Francisco, Cal.

the OGDEN-OSPREY

...a six-place, trimotor ship of utmost SAFETY, COMFORT and ECONOMY, will be displayed for the first time at the DETROIT ALL-AMERICAN AIRCRAFT SHOW...



These features combine to make the OSPREY outstanding as a light transport plane...

safety

Three American Cessna engines... maintenance costs afforded by use of 12-line motors... chairs secured directly to fuselage... wide landing gear... no propeller overlap... swing-over dip. control... improved type of independent brake control...

comfort

Sound-proof cabin... large roomy arm-chairs and single leg room... lavatory... ventilating system draws fresh air in cabin... cushioned sole space... cabin door located close to ground... sensitive cable starter and fueling...

economy

Low initial cost... 4-in-line, air-cooled motors give increased performance due to low head resistance... greatest payload per horsepower of any trimotor ship... good gas consumption only 18 gallons per hour with full load... accessibility of motors provides ease of adjustment and repair...

ILLUSTRATED BOOKLET WILL BE SENT ON REQUEST

OGDEN AERONAUTICAL CORPORATION

1119 SOUTH MARKET STREET

INGLEWOOD

CALIFORNIA

3 pioneers pass another milestone of dependable service

The passing of 1929 marked the close of another year of dependable service by the air mail . . . that pioneer of commercial aviation.

Likewise, 1929 marked the completion of a year of dependable service by two other pioneers in the aviation industry . . . Stanolind Aviation Gasoline, Stanolind Aero Oil. Early in the history of commercial aviation these two products began to contribute their share to the success of flying. No more convincing proof of the dependability with which they perform can be found than in the record they have made . . . many thousands of flying hours with never an engine failure traceable to any fault in either of these products.

Today Stanolind Aviation Gasoline and Aero Oils are better than ever. Constant research work keeps them up to date to meet the ever changing requirements for aviation fuel and lubrication.

Stanolind Aviation Gasoline and Aero Oils are well known at midwestern airports and preferred by the majority of pilots. These men know that they can rely on Stanolind Aero Products.

STANDARD OIL COMPANY
(INDIANA)

910 S. MICHIGAN AVE., CHICAGO, ILL.



STANOLIND AVIATION PRODUCTS



AIRMAIL
BEACON
TOWERS
U. S. Dept.
of
Commerce

RADIO
BEACON
TOWERS
U. S. Dept.
of
Commerce

CEILING
LIGHT and
WIND CONE
TOWERS

Port Columbia

BOUNDARY
LIGHT
SUPPORT



CURVED ROOF STEEL FRAMES

THE INTERNATIONAL DERRICK & EQUIPMENT COMPANY

COLUMBUS, OHIO HOUSTON, TEXAS LOS ANGELES, CALIF.
New York Pittsburgh Wichita Tulsa Ft. Worth St. Louis Kansas City Miami San Francisco

TRANSCONTINENTAL AIR TRANSPORT, INC.

1938-1939

BY KATHA, MD.

July 12, 1938

I am very glad to hear that you are interested in the Transcontinental Air Transport, Inc. and its service to the public.

There is a great deal of interest in the Transcontinental Air Transport, Inc. and its service to the public. The company is a pioneer in the field of air transport and is a leader in the industry.

My first experience with Transcontinental Air Transport, Inc. was in 1937 when I flew from New York to Los Angeles. The service was excellent and the crew was very friendly.

The flight was very comfortable and the service was excellent. The crew was very friendly and the flight was very smooth. I am very glad to hear that you are interested in the Transcontinental Air Transport, Inc. and its service to the public.

Sincerely,
Katha

K. M. KATHA
Washington
D. C.

100-10

90% of the World's Lighted Airways are using IDECO Beacon Towers

Years of specialization have given us an experience in building airway and airport equipment unequaled by any organization in the world. IDECO equipment is used by the U. S. Army, Navy, Department of Commerce, The Transcontinental Air Transport Inc., The Texas Air Transport and by many Municipal and private airports.

Call or write our nearest branch, we will gladly give you the benefit of our experience in meeting your requirements.

This is one of a series of advertisements devoted originally to advertising that is an effort to make advertising advertising more probably in larger and better. It is printed in these pages as an indication to readers that McGraw-Hill publishing standards mean advertising is relevant as well as efficient writing.

Squelching another whispering campaign—



"Look out for that company, it's slipping," said the whisperers. Its product, an assembled unit sold to manufacturers to build into their machines, was of high quality but had been sold only through salesmen and direct mail.

Sales were falling off. The market, conscious of the gossip, was suspicious of the financial strength of the seller. This increasing sales resistance was undermining the morale of the sales staff.

With this serious situation facing it, the company called in an advertising agent who recommended an emergency advertising campaign in a McGraw-Hill publication covering the particular market. The program, the first publication advertising ever used by this company, consisted of color spreads in every issue.

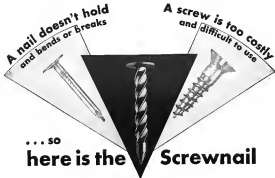
That was only a year ago. Today, as evidence of the company's comeback, sales are not only mounting but the advertiser's chief competitor has offered to sell out to the new advertiser. *From bottom place to top position in recognition in one year.*

MORAL: Selling is not a choice between salesmen, publication advertising and direct mail but a matter of co-ordinating all three and using each on a basis of the job to be done.

McGraw-Hill Publications

New York Chicago Cleveland Dallas Philadelphia St. Louis
Cincinnati San Francisco Boston London

FOR FASTENING SHEET METAL TO WOOD



...with 4 times the holding power of ordinary nails
...made so that it will not bend or break

BOTH common nails and wood screws are unsatisfactory fasteners for fastening sheet metal to wood. They'll loosen, though, that a combination of both would give you an ideal device for such work—a device that would drive like a nail, but hold like a screw.

Here it is—the **Hardened Screwnail**. Combines the driving qualities of a nail and the holding qualities of a screw. Designed especially for fastening sheet metal to wood.

You can drive a Screwnail through sheet metal into wood much more easily and quickly than a common nail because



1. No need to punch a hole—sharp needle point glides thru sheet metal with ease.

of the hardened needle point. And having great tensile and shear strength it does not bend or break readily like a common nail.

Once in, the Screwnail stays in. It will not back out or pull out or loosen. Laboratory tests prove that Screwnails have over 4 times the holding power of ordinary nails.

The aviation industry will find this new Nail decidedly superior for use where sheet metal must be securely fastened to wood. Try them on your own work—we'll provide free samples for a test just tell us what you want to fasten.



2. Hardened, spring thread forms a thread in sheet metal and wood. Audible shear noise or easy to wood.

PARKER-KALON CORPORATION
Dept. M, 100-200 Van Ness St., New York, N.Y.

PARKER-KALON HARDENED Screwnails

U.S. PAT. 2,800,000

All Prices of Stuart Parts Based on Production Quantities



BEING actually in production on motor parts in our large, well-equipped plant . . . we can offer a greater degree of accuracy and finer workmanship . . . at a price per unit considerably below production costs on like products manufactured by individual aircraft producers.

For the design and manufacture of parts requiring the making of special dies and jigs . . . we offer you the services of our engineering staff composed of specialists . . . whose reputations for doing good work place them among the leading authorities in their particular phase of aircraft design.

Our experience . . . well equipped plant geared for straight line mass production . . . and the volume of business we do at a low selling cost . . . is helping many of America's leading aircraft producers to cut production costs.


Advise us of your requirements and we shall be pleased to serve you with satisfaction and profit.

Stuart Aero Products, Inc.

Manufacturers Motor Parts, Tanks and Cowlings
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 <p>Hand-carrying lantern, of continuous glass construction, same lens Department of Commerce specifications.</p>	 <p>Type LAN, presents low level light on road resistance and gives close guidance of ground details.</p>	 <p>Electric Cady Beacon, of weatherproof, non-flammable alloy construction, for airports and air navigation marking.</p>
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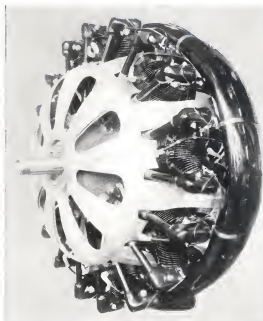
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